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TRANSCRIPT OF PROCEEDINGS
FOR

MARCH 23, 1976

PAGES 8934-9134

INDEX

Colstrip 3 & 4 — Page

WITNESSES

March 23, 1976, Tuesday 8934

REBUTTAL

JACK LOWRY

- Written Direct Statement 8936
- Cross, by Northern Plains Resource Council 8938
- Redirect, by Applicants 8970
- Re-cross, by Northern Plains Resource Council .. 8972
- Re-redirect, by Applicants 8981
- Re-re-cross, by Northern Plains Resource Council 8982

DR. CARLTON D. GRIMM

- Written Direct Statement 8984
- Cross, by Department of Natural Resources and Conservation 8995
- Cross, by Department of Natural Resources and Conservation (continuing) 9016
- Redirect, by Applicants 9038
- Re-cross, by Department of Natural Resources and Conservation 9043
- Re-redirect, by Applicants 9050
- Re-re-cross, by Department of Natural Resources and Conservation 9051

CHADWICK L. MARTINS

- Written Direct Statement 9053
- Cross, by Northern Plains Resource Council 9061
- Cross, by Department of Natural Resources and Conservation 9085
- Redirect, by Applicants 9086

INDEX

Colstrip 3 & 4 — Page

WITNESSES

March 23, 1976, Tuesday (continuing)

REBUTTAL

ROBERT J. LABRIE

Written Direct Statement 9089
Cross, by Northern Plains Resource Council 9094
Cross, by Department of Natural Resources and Conservation 9111
Redirect, by Applicants 9129
Re-cross, by Department of Natural Resources and Conservation 9131

TUESDAY, MARCH 23, 1976

The hearing reconvened at 9:15 A.M. on Tuesday, March 23, 1976, in the Chambers of the Montana House of Representatives, State Capitol, Helena, Montana.

The Honorable Carl M. Davis, Hearings Examiner, presided over the proceedings.

APPEARANCES:

Applicants:

John L. Peterson, Esq.
John Ross, Esq.

Department of Natural Resources and Conservation:

Arden E. Shenker, Esq.
Donald MacIntyre, Esq.

Northern Plains Resource Council:

Leo Graybill, Jr., Esq.

The following proceedings were had:

HEARINGS EXAMINER: Let's proceed.

JACK LOWRY, called as a rebuttal witness by the Applicants, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

HEARINGS EXAMINER: Mr. Ross?

MR. ROSS: The applicants offer the written testimony of Jack Lowry, and there are no exhibits.

HEARINGS EXAMINER: Very well, I understand the DNR before going on the record is not going to cross-examine Mr. Lowry, so Mr. Graybill will conduct the cross-examination.

(THE WRITTEN DIRECT TESTIMONY OF MR. JACK LOWRY WAS DIRECTED TO BE INSERTED AT THIS POINT.)

STATEMENT OF TESTIMONY OF

JACK LOWRY

My name is Jack Lowry. I own and manage the Montana Pump and Equipment Co., which is located at Fourth Avenue at Fourth Street South in Great Falls, Montana. Montana Pump and Equipment Co. designs, installs and sells pumps, pipe and related equipment for irrigation and domestic water systems.

The purpose of my testimony is (1) to discuss growth of sprinkler irrigation in Montana and the energy it requires, and (2) to point out that sprinkler irrigation systems can be designed to adapt to the presence of transmission lines.

First, the growth and potential growth of sprinkler irrigation in Montana is evident to me. In 1975 our company installed and/or sold pumps or pumping units which have a combined horsepower of approximatly 8,000 hp. These sprinkler pumps require a lot of energy. For example, using the rule of thumb that approximately one horsepower equals one kilowatt of electricity, these sprinkler units that our company installed in 1975 alone would use approximately one-half the generating capacity of the Black Eagle power plant located at Great Falls. In 1975, our gross sales were almost $2,000,000. In 1976, we expect sales of $3,000,000.

Secondly, there are numerous types of sprinkler irrigation equipment which can be adapted to almost any situation, including the presence of obstacles such as coulees, transmission lines, sloughs, drain ditches, rocks, etc. Many of the irrigation systems we install are designed for rough terrain or the presence of such obstacles. These obstacles do not affect the safe operation of the sprinkler equipment. For example, I am aware of a sprinkler irrigation system being used around transmission lines at Loma, Montana.

EXAMINATION OF JACK LOWRY

Rebuttal, Cross, by Northern Plains Resource Council

By Mr. Graybill:

Q Okay, Mr. Lowry, you're from Great Falls, right?

A Yes, sir.

Q And you run a company called Montana Pump and Equipment Company?

A That's right, sir.

Q How long have you lived in Great Falls?

A About seven years at this time.

Q Where did you come from before?

A Seattle.

Q Seattle?

A Yes, sir.

Q What was your business in Seattle?

A I worked for the Boeing Company, sir.

Q Are you an owner of Montana Pipe and Equipment?

A Montana Pump Equipment, yes, sir; I'm the sole owner.

Q Sole owner. How did it happen that you came to the hearing here?

A Well, of course, I am in the irrigation business, and I install a great deal of pumps and related equipment. One of the problems we're having now is getting water for our systems and getting energy.

Q Well, I understand that. I've read your statement, but is --

MR. ROSS: Well, I think the witness can explain his answer.

MR. GRAYBILL: Mr. Ross, let me conduct my cross-

examination.

MR. ROSS: Okay, and let the witness answer the question.

Q I'm not interested in your -- at this point -- in the reason you might have come. I want to know who contacted you, or who got you to come here?

A No one, sir.

Q No one. You are coming on behalf of the applicants, though, isn't that right?

A That's right, sir.

Q So somebody must have contacted you?

A I offered my services, sir.

Q I see. When did you do that?

A Oh, the first time about two months ago.

Q And did you do that after talking to somebody with the power company?

A Yes, sir.

Q And who was that?

A Mr. Tom Williams.

Q Tom Williams?

A Yes, sir.

Q What's his function?

A I believe he's in the -- some type of real estate and has to do with the location of substations and etc. for Montana Power.

Q Well, now he talked to you, and did he tell you you could be a witness here?

A He didn't say that. I said if I could ever give my services,

I would.

Q Has anyone else talked to you about your testimony here?

A Not really, except after I'd volunteered my services, Mr. Ross here got in touch with me.

Q Oh, so you and Mr. Ross have conferred on your testimony?

A Well, we've talked about it, yes.

Q Well, now you're under oath, Mr. Lowry. I want you to tell me what it is that he told you about it?

A After I had volunteered my services, Mr. Williams said he would talk to the company. I presume he did, and I received a phone call. I talked to Mr. Ross and said I would be more than happy to give my testimony.

Q Well, now as I understand it, the case is closed for testimony; you're a rebuttal witness?

A I don't remember, sir; I'm not an attorney.

Q What?

A I say whatever you say; I'm not an attorney.

Q Yes, I understand you're not an attorney, Mr. Lowry. Have you read any of the evidence in the case?

A I read the newspaper everyday. In fact, I read it this morning.

Q Well, now the newspaper, in case you didn't know it, Mr. Lowry, is not the evidence in this case. It contains precious little of the evidence in this case. What I asked you is if you've read any of the transcript or evidence in this case?

A No, sir.

Q Do you know what anyone else in this case has said?

A Just what I read in the paper, sir.

Q Just what you read in the paper. Do you know what testimony it is that your testimony is designed to rebut?

A Not really, except that we need the energy for irrigation; we need the water.

Q Well, those would be interesting points to raise on the direct case of the applicants, but I have been trying to figure out what it is that you're supposed to be rebutting here, and I wondered if you knew?

A Any relation of sprinkler irrigation equipment to the location of transmission lines.

Q Well, that's the subject of the last sentence of your statement, but it's not the subject of the sentence where you say the purpose of your testimony is to discuss the growth of sprinkler irrigation in Montana?

A That's exactly right, sir.

Q Yes. Well, the proponents, or the opponents here, have been trying to prove all summer and all winter that irrigation in Montana, sprinkler irrigation, is growing. You would agree with that, wouldn't you?

A Certainly would.

Q And don't you think that that's an important facet of the agricultural base of Montana?

A I certainly do, sir.

Q And I suppose that although you live in Great Falls and sell in that area, you would agree that sprinkler irrigation is an important facet of the Yellowstone valley agricultural base, too; wouldn't you? What I want to know is don't you think that sprinkler irrigation is important in the Yellowstone valley as well as the Missouri valley?

A I think it's important to the whole state of Montana, sir.

Q Are you familiar with the Yellowstone valley?

A Well, not like I am up around Great Falls.

Q Have you ever been down the Yellowstone way?

A I've been down there on a couple of visits, yes.

Q Forsyth?

A Down in the area of Miles City, Forsyth, Glendive.

Q Now in order to be able to have sprinkler irrigation, you have to have water, don't you?

A You certainly do, sir.

Q So that you'd agree with me that the amount of water taken out of the Yellowstone River system in the months of August and September, for example, or July and August, are fairly important to the sprinkler people, aren't they?

A Definitely.

Q And I suppose, since you're in favor of sprinkler irrigation, you'd be in favor of safeguarding the supply of water in the Yellowstone River basin for agricultural purposes, wouldn't you?

A Well, yes I would.

Q And if you knew that the month of August was traditionally a low water month on the Yellowstone River, you'd be interested in how much water was being withdrawn during that month, wouldn't you?

A If it was adverse to sprinkler irrigation, I'd want to know about it.

Q Do you know whether or not the water being withdrawn by this project is adverse to sprinkler irrigation, sir?

MR. ROSS: I object as being beyond the scope of rebuttal testimony.

HEARINGS EXAMINER: Overruled; he can answer.

Q You really don't know that; is that right, Mr. Lowry?

A That's right, sir.

Q So what you're saying here is that you want power for irrigation, but you're not sure of the effect that the plants will have on sprinkler irrigation in the Yellowstone valley; is that right?

A Well, sir, we need the energy and we need the water and we need the land, so we need all three in conjunction with each other.

Q Well, as a matter of fact, that's a very astute observation that we need all three. You wouldn't be in favor of doing away with part of the agricultural base of Montana to get energy, would you?

A Definitely not; that's what I'm trying to do is increase the agricultural base.

Q Well, there's been a good deal of testimony here which I presume you haven't read that the plants down in Colstrip may reduce the agricultural base of southeastern Montana. If that were the case, would that disturb you?

A If that were the case, it wouldn't disturb me, but I would be concerned.

Q You'd be concerned about it. One of the problems that we have in the case and that the board has to face in making a decision here is whether the off-stream storage provided by the plant design is sufficient to carry the plants through an abnormally dry August year. Do you have any background on that fact or that problem?

A No, sir, I would not; however, I think if that were the case, they'd probably curtail their generating at that point in time.

Q Oh, you think that the way to accommodate agricultural need to energy production is to curtail energy production; is that your testimony?

MR. ROSS: I'm going to object because I think this whole line of questioning assumes facts that aren't in evidence. The facts are that the water withdrawal is minimal and does not require curtailment.

MR. GRAYBILL: Well, that's not the facts, Mr. Ross.

HEARINGS EXAMINER: Overruled; you can ask him, conduct it in questioning.

Q Do you remember the last question?

A Say it again, sir.

Q So you believe that when agricultural needs and energy production clash, or cannot co-exist, that the proper way to solve that dilemma is to curtail energy production until such time as it doesn't clash with the agricultural need; is that your view?

A I think I'd put it something like this. I'm sure that if the water required to generate at a certain point in time got to the point where it adversely affected something, that they might reduce their generating capacity at that point in time to compensate for the reduction of water.

Q And what basis do you have for believing that these applicants would reduce the energy production at these plants --

A Sir, that's only an assumption.

Q Now wait until I finish the question. You'll have a lot better chance to answer it, Mr. Lowry. What basis do you have for believing that these applicants will curtail their generation capacity, or generating of electricity, in the event of a problem of low water, or a problem that affects agriculture? What's your basis for assuming that they would do that?

MR. ROSS: I'm going to object again that it still assumes facts that aren't in evidence.

HEARINGS EXAMINER: I didn't hear the question so go ahead and you can answer it.

MR. GRAYBILL: He's going to let you answer, so go ahead, Mr. Lowry.

A I really have nothing to base it on; it's just an opinion. I said they may.

MR. PETERSON: (Inaudible, not talking into a microphone.)

MR. GRAYBILL: Mr. Peterson, this must be bothering you that you --

MR. PETERSON: No, the question doesn't bother me at all, but you're rambling outside of the witness' testimony -- remainder of sentence is inaudible.

MR. GRAYBILL: Well, now, Mr. Peterson, so that you understand what I'm doing, he says his purpose is to discuss the growth of sprinkler irrigation in Montana, and he's just made the statement, which I didn't make, he made, that one of the ways that agriculture and energy production could be made to co-exist was to cut down on energy production when it got in the way of agriculture, and I'm asking him the basis for his statement. I don't --

HEARINGS EXAMINER: And he's answered the question. He said it's just his opinion.

MR. GRAYBILL: Right.

HEARINGS EXAMINER: So let's go on to the next one.

Q Do you think that before we build plants which will obviously take some water during the critical period, the summer time, which could be used for sprinkler irrigation, before we build those plants, we ought to know how much water is necessary for the sprinkler irrigation?

A Sir, I don't think we'll ever know that question.

Q You don't think we know that question?

A I don't think we'll ever know that question. How much development are we going to have in sprinkler irrigation. Southern Idaho is having a boom, northern California spent I don't know how many billion dollars to bring water through the Feather River project for I don't know how many miles.

Q Well, you wouldn't propose that we get Montana in the position where it has to import water in order to produce power, would you?

A Certainly not; I'm not saying that at all. I'm just saying how important sprinkler irrigation is to our economy, to our country, and to the world.

Q Do you know whether sprinkler irrigation estimates have been made of the Yellowstone valley area?

A I have no idea.

Q If I told you that the Bureau of Reclamation and the Department of Interior was engaged right now in a study to determine how much irrigation water will be necessary in the near future to try and categorize and classify the irrigation needs of that river system, would you think it was important to have that information before we built Colstrip 3 and 4?

A Well, of course, this is only an opinion; you understand that. I think having some knowledge of that would be important, but I am sure that the Corps of Engineers and the Bureau of Reclamation already have a great deal of that data available.

Q Well, you weren't here then when one of their regional executives testified that they did not have that data in their present study, and that they had commissioned a new study for that; you didn't know that, is that right?

A That's right, sir.

Q Well, that happened here in the hearing. Oh, yes, Mr. Witness Gibbs testified that the study which the applicants made Exhibit 165, which is the Department of Interior's study of the potential for, well it's their study of the Yellowstone River system, that didn't include any information on irrigation. Are you familiar with Exhibit 165 that the Department of Interior put out?

A No, sir.

Q I see. Well, they did a long study, a great study, about 200 pages thick which the applicants have put in as their Exhibit 165, and Mr. Gibbs pointed out that there was no real evidence in there of the irrigation needs in the Yellowstone valley, but he further testified that the Department of Interior, the Bureau of Reclamation had been ordered to conduct just such a study. Don't you think that the results of that study would be an important bit of information to protect the industry you're interested in, the sprinkler irrigation industry, before we build 3 and 4?

A Well, I'd have to think about that a little bit, but no, I don't think that study would absolutely be necessary.

Q You'd rather go ahead and build 3 and 4 without knowing what affect it would have on sprinkler irrigation in the Yellowstone valley?

A Well, I'm not sure of the water requirements as far as Colstrip 3 and 4, but I don't think they're such monumental quantities of water that it's going to take up all of Yellowstone River.

Q Well, they really aren't. As a matter of fact, they are, as Mr. Ross says, minimal; but in a dry August, they become very significant, Mr. Lowry. Are you saying that you don't care what happens in a dry August to the sprinkler irrigation system of the Yellowstone River?

A I answered that question awhile ago, sir.

Q Well, let's -- I'd like to --

A When I made an opinion.

Q Now I asked you if you cared about the --

A And I said, yes, I do care.

Q About a dry August?

A And I also said I answered that question awhile ago.

Q So you do care about that?

HEARINGS EXAMINER: He cares three times, Mr. Graybill.

Q Yes, and what are you going to do to safeguard the irrigation industry in the lower Yellowstone River valley in August, Mr. Lowry? What is your proposal to safeguard that?

A You know, I really think what we ought to do is sit around another four or five years.

Q Pardon?

A I think what we ought to do is just sit around for another four or five years.

Q Well, in other words you think that if we --

A I'm being smart. What I'm saying is --

Q Just wait four or five years and we might know what's going to happen; is that right?

A I think that's what we should do with the whole country, just wait on everything. We don't need any energy or anything.

Q Well, there are some people that think you may be right, that we're wasting the energy we're using. Let's go ahead, Mr. Lowry, with your statement. You say here that sprinkler pumps require a lot of energy?

A That's right, sir.

Q Yes, where do you get that information?

A Well, it takes approximately 746 watts to equal one horsepower, but after you make transmission and transformation it takes about 830; rule of thumb, one kw equals -- of generating -- equals one horsepower.

Q You figured that out.

A I didn't figure it out; I use it everyday.

Q How many units did your -- or how much sprinkler irrigation did your company install in the area around Great Falls in 1975?

A I don't have the exact figure, but I can give you quite a few. At Mr. Charles Ruby's ranch south of Great Falls we have 800 horsepower pumps on one project.

Q Well, it says right here in your statement that the sprinkler units that your company installed in 1975 alone would use approximately half the generating capacity of Black Eagle power plant. Now if you don't know how many units you installed in 1975, how can you make a statement like that, Mr. Lowry?

A Sir, you're just reading something in there. I said -- that's exactly right. Over 8,000 horsepower in pumps was installed by my company last year.

Q Eight thousand horsepower?

A Over 8,000.

Q Of pumps?

A In pumps, in motors. I just said that the Charles Ruby ranch south of Great Falls, on one project, we put in over 800 horsepower. For Mr. John Greytak, we have over 3,200 horsepower, one project again. This year we've completed a project for Mr. Lee Belode at Cascade; we have 38 one horsepower motors and we have four 75 horsepower motors. That was my company. A competitor put in three other center pivots and they have three 100 horsepower pumps on that.

Q So in other words, the irrigation system is growing rapidly in your area, right?

A Definitely.

Q All right, now it says here that this horsepower that you've installed would equal one half the Black Eagle power plant. Who told you how much the capacity of the Black Eagle power plant was?
A That's public knowledge, sir. You can go --
Q Oh, I know that it's public knowledge; I asked you who told you?
A I think I read it on a plaque down at the dam one time I was down there.
Q I see. And what is the generating capacity of the Black Eagle power plant, Mr. Lowry?
A I think it's around 18,000 kw.
Q Eighteen thousand?
A Kw; I mean not kw; yes, 18,000 kilowatts.
Q Per what?
A That's the capacity of the power plant.
Q That's the capacity?
A That's right.
Q Now when you say that you put in enough to take a half of the generating capacity of that plant, you don't mean that the capacity you installed comes from the Black Eagle plant, particularly, do you?
A That's only a corrolation, sir.
Q It's only a corrolation?
A In other words, if you cut off all the lines and put all the pumps that I installed off of that dam, it would take approximately half of that dam to supply the power.
Q Do you know where Mr. Greytak's power comes from?

A Yes, sir.

Q Where?

A Glacier Electric.

Q Do you know where they get their power from?

A I think part of it comes from Montana Power, I think part of it comes from the Fort Peck generating facility.

Q Bureau of Reclamation, right?

A Yes.

Q And none of this power that you've referred to in your statement, none of this installed capacity, is in the Yellowstone area that Colstrip is in; is that right?

A That's right, sir.

Q But there are others down there installing irrigating capacity in that area?

A I hope to be in that area next year, sir.

Q Now were you aware that except for Pacific Power and Light none of the applicants in this case here intended to use any of the power generated at Colstrip for agricultural purposes?

A I have kept abreast of that part from the newspapers, sir. I think Puget Sound Power and Light is in there, Washington Water Power, a couple of others. You see energy is readily transferred from one area to the other; we know that. I think it's pretty nice if we can import natural gas, for instance, from Canada, or crude oil. It would also be nice if we could ship something back to them, isn't it?

Q Mr. Lowry, I don't like to interrupt you, but I wonder if you know what I asked you?

A Yes, I do. Yes, I know that part of the power that will be generated will be transferred out of the state, but what about when the time comes that maybe we need some power.

Q That isn't what I asked you, Mr. Lowry. Now let's start over again and see if we can get the question to you, and then maybe we can get your answer. I asked you if you knew that except for Pacific Power and Light none of the generation to come from Colstrip was intended by the applicants to be used for agricultural purposes?

MR. ROSS: I'm going to object. I think that's contrary to the evidence. There are a number of exhibits and testimony in this record which indicate that the power from this project will be used for sprinkler irrigation.

HEARINGS EXAMINER: Sustained.

MR. GRAYBILL: Well, Mr. Hearings Examiner, I'd have to have the record show at this point that the interrogatories are sworn to and are part of the evidence in this case, and Interrogatory number 63 says precisely what I said, and I challenge Mr. Ross that that's not the record and I do think I have a right to examine this witness on what the interrogatories say.

HEARINGS EXAMINER: Well, he's not acquainted with the interrogatories, and that's repetition, and we know what interrogatories are in evidence through several witnesses.

MR. GRAYBILL: All right, but I'm about to find out what he knows about the interrogatories, sir.

HEARINGS EXAMINER: Well, we're not going to go through all the 97 interrogatories with this witness.

MR. GRAYBILL: No, we're only going to go through number 63, sir.

HEARINGS EXAMINER: And he's not acquainted with it.

MR. GRAYBILL: Well, he's going to be in about one half minute.

HEARINGS EXAMINER: Make an objection, and we'll find out.

MR. GRAYBILL: All right, that will be fine. If you want to stop me from cross-examining this witness, Mr. Hearings Examiner, you certainly may.

HEARINGS EXAMINER: I know it, and just go ahead and make your question. We'll take care of it as it comes along.

MR. GRAYBILL: I do think that the Hearings Examiner shouldn't put me in a position of threatening to withdraw my right to cross-examine.

HEARINGS EXAMINER: You'll put yourself in any position you get in, Mr. Graybill, so just ask your question.

Q Now, Mr. Lowry, Interrogatory number 63 was directed toward these five utility companies, and it said do any of the utilities involved in this proceeding foresee major commitments for agricultural consumers, particularly for irrigation projects? Please explain any present commitments for increased agricultural use of electricity and set forth what relationships such agricultural uses has to the need for Colstrip 3 and 4.

MR. ROSS: Okay, I'll object on the basis it's beyond the scope of rebuttal, it's repetitious, it's contrary, misleading, and has no probative value.

HEARINGS EXAMINER: He hasn't asked the question yet.

MR. GRAYBILL: I haven't asked the question yet, so save your little speech, Mr. Ross.

Q The answer to that by the applicants was that the applicants do not foresee any major additional commitments to agricultural consumers except Pacific, Pacific Power and Light, and then it goes ahead and talks about what Pacific intends to do in Oregon. Now were you aware, Mr. Lowry, were you aware that the applicant companies in answering interrogatories in this case have indicated that they really do not intend to commit any of this power to agricultural use including irrigation?

MR. ROSS: Same objection.

HEARINGS EXAMINER: Okay, overruled. You can answer whether you're aware of that interrogatory or not.

A I would like to answer that I'm not aware of it, but I'd like to make a statement.

HEARINGS EXAMINER: Go ahead.

A I don't think it's necessary that these companies make a commitment to agriculture or to the sprinkler irrigation industry. I think what is important is that the energy be available if we do need it. Southern Idaho, for instance right now, has reached the point where they can put in no more, hardly anymore, irrigation due to the fact that they have, do not have the energy available to run the pumps. Idaho Light and Power has sustained and stopped many sprinkler irrigation projects from going in this season.

Q Have you sold sprinkler systems in Idaho?

A No, but I have some friends that are in the irrigation business down there.

Q And are you reporting what you know of your own knowledge, or what some friend told you?

A I don't think that I have to come out with a fact to that, sir. I think it's public knowledge. I could give you --

Q Do you understand my question, Mr. Lowry?

A Yes, I do.

Q Are you reporting what you know or what a friend told you?

A I am reporting what my associates in the industry have told me.

Q I see. So it doesn't concern you that the applicants here are not committing any of this power to agricultural purposes?

A Have they made a statement as to what they are committing it to?

Q Oh, I think it's clear what they are committing it to; 70 percent of it is to be exported to the Pacific Northwest, for example. Now I'm asking you if it concerns you that they are not committing any of it to agricultural purposes including sprinkler irrigation, or irrigation projects?

MR. ROSS: I'm going to object again. I think it assumes facts not in evidence, and it's contrary to the evidence when he says that the applicants have not indicated that part of this power will be for sprinkler irrigation.

HEARINGS EXAMINER: Well, you can answer whether you're concerned or not; overruled.

Q You may answer.

A What do you want me to answer, sir?

Q Whether it concerns you that these applicants have not committed any of this power for agricultural purposes including irrigation projects?

A Well, I guess the only think I can say to that is I don't know whether they committed it or not, and I'm sure if they have the generating capability and they have the power available, they'll commit it to agriculture or whatever industry needs it.

Q Do you have any idea of the magnitude of growth of irrigation in the area you serve; that is, how much more irrigation there is there now than there was, say, five years ago?

A A thousand percent more.

Q Do you imagine that the situation would be any different in the Yellowstone valley?

A I think it'll grow in relation to the power and to the water available and to the financial resources that are available to the ranchers to finance this stuff.

Q Well, do you know of any power shortage in the Yellowstone valley at the present time?

A No, sir, I don't.

Q And are you aware that Colstrip number 1 is going to give the Montana Power Company another 350 megawatts of power; did you know that?

A Somewhere in that neighborhood, yes.

Q And that's just come on line, and another one is coming on this summer so that they'll have 350 megawatts of power more? Were you aware that this is going to raise by something like

30 percent to 35 percent the amount of power available in the irrigation season for the Montana Power Company?

A Sounds good, doesn't it?

Q And that's without building 3 and 4, Mr. Lowry. Did you know that?

A Yes.

Q You did know that. And so you're not really concerned, are you, that there won't be power available in the Yellowstone valley to irrigate?

A I think that the energy that we need is not only needed in the Yellowstone area, it's needed throughout the state and throughout the nation.

Q Okay, let's talk about the state. Are you aware of any need for power in the state of Montana that the Montana Power won't be able to meet with Colstrip 1 and 2?

A Well, I guess I'll have to answer that question in this manner. As our natural gas and petroleum is cut off from the Canadian sources, we'll probably see a switch over to electric heating and things like this. I'd like to see a little bit more industry in Montana, nothing real big or heavy, but I think we're going to need this energy, sir, in the future.

Q Well, I'm asking you if you have any facts upon which to base your statement. In other words, do you know of any shortage of power in Montana now?

A Sir, I am not an expert witness on that, sir, and I didn't come here for that purpose.

Q Are you an expert witness on natural gas?

A No, sir, I'm not.

Q In other words, you've just said that our gas is going to be cut off. Are you aware that the province of Alberta has just again agreed to raise the amount of power that can be imported?

A I heard something to that effect about 24 or 48 hours ago. However, I'm opening a store in southern Alberta, Coaldale, for instance, for irrigation purposes; and that province happens to be pushing irrigation very heavy and have committed a great deal of money to further the development of sprinkler irrigation in southern Alberta.

Q Well, Mr. Lowry, you'd understand, wouldn't you, that certainly I and my clients have absolutely no quarrel with you that improving and increasing the amount of irrigable land in the state of Montana and the province of Alberta is a marvelous thing?

A Yes.

Q That's necessary to raise more food and fiber for America and for the world, isn't it?

A That's exactly right, sir.

Q But you also need land and water in addition to power to do that, don't you?

A That's exactly right. They all go hand in hand, sir.

Q Now you say that you're familiar with sprinkler irrigation systems that operate around transmission lines at Loma, Montana. Are you familiar with a book put out by Bonneville Power Administration on tips on how to behave near high voltage power lines?

A I haven't read that particular article, but I behave very cautiously.

Q Well, and so would most of the ranchers, wouldn't they?

A I suppose so, sir.

Q For example, if you wanted to refuel your pick-up underneath a power line, you've got to be careful. Did you understand that or know that?

A I would be careful about a lot of things.

Q And you would agree with me, wouldn't you, and with about 20 farmers that testified here a couple of weeks ago that putting a power line through an irrigated field is not conducive to increasing the production or making it easier to operate?

A Well, naturally a flat, level square field is the easiest one to irrigate.

Q And if it has a power line down the middle of it, how does that help?

A Well, it certainly wouldn't help any.

Q The systems that you sell, are they pipe systems, aluminum pipe systems?

A I sell all types, sir.

Q Well, is that one of the types you sell?

A Yes, sir.

Q Do you sell this circular type that swings on a big pivot?

A Yes, sir.

Q How does that work with a power line through the irrigating field?

A The circular pivot, the center pivot, if the power line were right through the center of the field, would make it rather difficult, although we could install it in such a manner that it could traverse 180 degrees.

Q In other words, it could go back and forth instead of going in a circle?

A Yes, sir, right.

Q But in other words, it would require that the land not be utilized in the normally most efficient manner; isn't that right?

A Well, that's true; except in that case, I probably wouldn't design a center pivot for that field. I'd probably put in wheel lines or hand lines or tow lines.

Q And if you put in wheel lines, you're either going to have to put in two, or you're going to have to break them into segments to get around the posts, aren't you?

A Normally in the irrigation business we look at one of two facets, and that's cost per acre to install the equipment and the monetary return. This is what the farmer is always looking at.

Q The cost per acre, is that raised when you have power lines in the middle of the irrigating field?

A Not necessarily.

Q It doesn't cost more to go around them?

A Not necessarily. It depends on the type of equipment you put in there. Obviously, the equipment that takes the greatest amount of physical labor to operate it is the least expensive, and the more automated it is is the most expensive.

Q Are you talking about operating costs, Mr. Lowry?

A No, I said obviously, the most expensive equipment, irrigation equipment, is that equipment that requires the greatest amount of manual labor to operate it, in other words, to move it, to use it.

Q That's the most expensive?

A That's the least expensive.

Q The one that requires the most manpower is the least expensive?

A It's the least expensive.

Q All right, now let's understand each other here because I certainly don't follow you. Are you talking about capitalization for the initial installation, or are you talking about amortization over the life of the --

A I'm talking about original installation.

Q I see. In other words, you would agree with me that the automatic system that does not require labor is cheaper to operate?

A Cheaper to operate for labor, but it costs the most money to put in, initially.

Q Surely, I understand that.

A I have some brochures here, and some of them show different facets of it. For instance, hand line, which is the least expensive way to irrigate, say a small field, requires the greatest amount of manual labor to use.

Q And you have to move the aluminum pipes?

A That's right, sir, by hand.

Q And would you suggest that that be done around power lines?

A It's done.

Q Oh, I am not asking that. I'm asking if you would suggest that that's the way to handle it around a power line?

A It would be one way of doing it, yes.

Q Are you aware that sometimes the power line has to be grounded, and that the tower itself has wires on it which ground the line?

A Oh, yes, the towers are grounded.

Q What happens if you happen to touch that under bad circumstances carrying one of these aluminum pipes?

A Well, I'm not an expert in that area, sir, but I would think that you would have zero potential to ground.

Q How long are these pipes?

A Oh, they vary in length, but the standard is forty feet.

Q Did you realize that the power lines here are going to have a 35 foot minimum height from ground?

A Sir, you don't tip the pipe in the air when you use it.

Q Well, you certainly don't intend to, do you?

A No, sir.

Q But if you happened to, and it touched the power line, can you imagine what would happen?

A You'd have to work awful hard to tip that pipe on end in the air. In fact, I'd say that you or I, either one, aren't strong enough to do it.

Q Would you have to tip it on end to have it touch a grounded fence line?

A A grounded fence line?

Q Yes, did you know that fences that go in the neighborhood of the high tension lines have to be grounded?

A Yes, sir.

Q Do you know why they have to be grounded?

A Yes, sir.

Q Why.

A Because of inductance.

Q Is it possible that you might be able to touch that with your aluminum pipe?

A Well, if it was grounded, it would still have zero potential to ground, sir.

Q If the system was working perfectly, right?

A I suppose.

Q Well, so what I'm trying to find out is is the aluminum pipe system that the farmer and his children carry around, is that the kind you propose they use under the power line?

A Not necessarily; I would look at the cost economics and come up with what the farmer wanted, what would do the best job for the least number of dollars.

Q Would you involve yourself at all in such matters as how to behave near the high voltage power line? In other words, would safety be a factor?

A Sir, we always instruct; that's one of the things we do when we sell a system. At the end of it, when we get ready to start the system up, we have a training session with the farmer in how to operate, maintain, and care for his equipment.

Q Well, I'm asking if safety would be a factor in deciding what kind of an irrigation system to use under a power line?

A I suppose safety would enter into it if I knew before I designed the system, and I'm quite sure I would know because I'd go out and look at the field, if a power line was there, I'd take a look at it; and I probably would design the equipment in such a manner that it would be safe to operate in that area.

Q Do you know now how to design an irrigation system under a power line?

A I think so, sir. If I had any questions, I'd get a hold of an electrical engineer and find out.

Q You said awhile ago that you expected the, or that you felt that the irrigation system in your neighborhood had grown on a ratio of about one thousand percent, a thousand percent in the last five years?

A That's right, sir.

Q What do you expect it to do in the next five years?

A Well, I hope it keeps booming.

Q No, no, I didn't ask you what you hoped; I asked you what you expected, and you're in this field and you've testified, and I believe you, that you own a company and you're opening another one in Alberta. You must know something about the field, about the industry. I'd like your best estimate as an expert in this field as to what is going to happen in the next five years?

A Tremendous growth, sir; I expect it to just keep growing.

Q And would you expect the same thing to happen in the Yellowstone valley as in your area?

A Yes, sir, I do.

Q So you can hardly even imagine the real potential for water need and land need; is that right?

A Well, this is one of the areas we are definitely looking at is the fact that we're able to bring land into production that's never been in production before.

Q Land up on benches and back away from irrigation ditches; wherever it can be pumped, you can put land into production now, can't you?

A Yes, sir.

Q That's assuming you have the water?

A Assuming you have the power, too, sir.

Q And assuming that there isn't pollution that makes it so the crop doesn't grow well, right?

A Well, yes, you could surmise that.

Q Surely, Mr. Lowry, you're going to agree with me that a little acid rain which you say you read about in the paper this morning isn't good for the irrigated farm, is it?

A I think there's a lot of conjecture in that opinion, sir.

Q Well, you mean you doubt that there is such a thing as acid rain?

A Oh, I didn't say that.

Q Well, acid rain isn't good for irrigated farms, is it?

MR. ROSS: I'm going to object. This is beyond the scope of rebuttal.

HEARINGS EXAMINER: Sustained.

Q Mr. Lowry, in preparing your statement for rebuttal here in the Colstrip case, what consideration did you give to the effect of these new power plants, proposed power plants, on the agricultural base of southeastern Montana, if any?

A Well, I guess I would say that I thought about it somewhat, and in my opinion the benefits derived from the plants at Colstrip 3 and 4 would outweigh the detrimental affects that they would have.

Q And what evidence or information did you have concerning the detrimental affects when you made that opinion, formed that opinion?

A Well, I just read in numerous magazines, articles. I feel that the Department of Natural Resources, the standards that have been established by the EPA, for instance, require them to do certain things with these plants, that the sulfur dioxide emissions be down, so on and so forth; and if they comply with these regulations, then what's the problem?

Q You just mentioned the Department of Natural Resources. Did you mean the Montana Department of Natural Resources?

A Well, these different departments have standards that we're trying to -- well, like the EPA, for instance. They have certain standards.

Q Yes?

A Like for auto emissions, or stack emissions, and stuff like that. My opinion was if they comply with these regulations, then what's the problem?

Q Well, were you aware that the Montana Department of Natural Resources has been very clear in its position that it does not believe the plants will comply?

A Well, I guess the only thing I can say to that is that --

Q I asked you if you were aware of that; I'm not asking you to comment on their viewpoint. I'm asking if you were aware that the Montana Department of Natural Resources really doesn't think the plants can comply?

A I had heard that.

Q And what effect did that have on your opinion? I'm talking about your opinion that on balance it would be better to build the plants?

A I also hear the power companies saying that they will comply, so I'll just take whoever's word for it.

Q You took their word instead of the department's word?

A No, I just say, sir, if they have certain standards that they are supposed to live with, then someplace down the pike they're going to have to live with them, aren't they?

Q No, I don't know. You say you've read the paper a great deal. Did you read in the paper about the violations at the Corette plant in Billings?

MR. ROSS: I'm going to object. This is far beyond the scope of this witness's rebuttal testimony.

MR. GRAYBILL: No, it's right on the point of why he made up his mind to make this statement.

HEARINGS EXAMINER: Overruled, you can ask if he read in the paper about the Corette plant.

A Yes, I read about it.

Q Well, you're aware then, are you, that it did not meet the standards?

A But I also read that they were working to comply with the standards.

Q Well, do you think that that's sufficient that they work to comply, or do you think that they should have to comply?

A Well, I guess my opinion there is this. It took the auto industry a few years to be able to comply with the EPA standards.

Q So what you're testifying here is that you'd like the power and it wouldn't matter to you if for a few years the standards were not complied with?

A Not at all, sir; I didn't say that at all.

Q That's not what you mean?

A No, sir.

Q What do you mean?

A I mean that I think that if they're not meeting the standards at a certain time, that I'm sure that they will comply with the standards; they'll have to because that's the law of the land.

Q Do you think that -- you understand that Colstrip 1 and 2 have just been built and are now about to be in operation. Do you think we should test them and see whether they can comply with the standards?

A I understand they are testing them, testing the first one.

Q Yes, are you in favor of that?

A Certainly.

Q In favor of a fair test on them?

A You bet you.

Q And do you think we should start 3 and 4 before we complete the fair test?

A Yes, I think we can go ahead because these people said that they would comply with the standards.

Q If they can?

A Well, are you going to stop them from building them without giving them a chance to prove whether they can or not?

Q Oh, no, I'm willing to run 1 and 2, Mr. Lowry, and so is the applicants. We're all in agreement on 1 and 2

MR. ROSS: I'm going to object again. I think that this line of testimony is far beyond the scope of rebuttal.

MR. GRAYBILL: All right, I think that's all I have at this time, Mr. Hearings Examiner.

HEARINGS EXAMINER: Mr. Ross?

Rebuttal, Redirect by Applicants

By Mr. Ross:

Q Mr. Lowry, don't you think that sprinkler irrigation may, in fact, increase the agriculture base in Montana?

A I certainly do.

Q Mr. Graybill asked you some questions about whether we should wait and make some more studies on potential irrigation in the Yellowstone valley, and you made some comments that yes, you thought we should sit around and do nothing for four or five years. When you said that, you were being facetious; is that correct?

A That's exactly right.

Q In your response to Mr. Graybill in his questions, you discussed the fact that sprinkler irrigation and electrical generation and water all go hand in hand. Is it your testimony that you think these things can, in fact, be developed and go hand in hand?

A I certainly do.

Q Can you give us some more examples of the types of irrigation systems that could be used in and around or under transmission lines?

A I have some brochures here that show the different types; if someone would like to take a look at them, they're welcome to. The traveling big gun is one system that could be used. The big gun is moved from station to station throughout the fields, and could be used. Hand lines and wheel lines can be used; and power transmission lines cause problems with irrigation, but so do ditches and slews, trees; all types of obstacles cause problems. We have to design our systems around these problems. We don't have perfect fields. Every field is different. Elevation, whether it goes up or down, the type of soil has a big effect on what type of equipment we put in.

Q Then it's your testimony that you can design irrigation systems to use around transmission lines just like you design systems to use around other natural and man-made obstacles; is that correct?

A That's correct, sir.

Q You also mentioned that you used aluminum pipe and other aluminum products in your sprinkler irrigation business. Do you know whether or not the manufacturer of this aluminum requires electrical energy?

A Well, I think it's common knowledge that the aluminum industry requires tremendous amounts of electrical energy.

Q Do you think that if there is a shortage of electrical energy for the aluminum industry that that may have an affect upon the availability of sprinkler equipment, and therefore, the possibility of using sprinkler irrigation in Montana?

A Well, I'd like to think that we wouldn't have anymore shortages like I had in '73, but we're running into that problem right now this year. For instance, I'm sold out of center pivots through July.

Q Don't you think that if there is an electrical shortage in the northwest, and if the aluminum industry has to be curtailed that could create an aluminum shortage and a shortage of sprinkler equipment?

A Well, it would definitely affect the aluminum industry and the availability of aluminum tube, but that also bothers me, not only the shortage, but what happens to the prices. I get tired of trying to quote jobs where the stuff I'm buying is priced, in effect, at the time of shipment. In other words, I don't know where I'm at from day to day then.

Q Is it your opinion that we should have an assurance that there's plenty of electrical energy available for sprinkler irrigation?

A Well, we have to have a lot of energy available. You see as we divert the water from hydroelectric generating to sprinkler irrigation, there's less water available to generate, so you've got to get it from some other source. Go to steam generating then, or nuclear generating. You see everytime we pull an acre foot of water out of the Missouri River, there is one less acre foot of water available to generate with.

MR. ROSS: No further questions.

Rebuttal, Re-cross, by Northern Plains Resource Council

By Mr. Graybill:

Q Do I understand, Mr. Lowry, you to say that your fear is that sprinkler irrigation will take so much water out of the river that they won't be able to generate electricity hydroelectrically?

A No, I didn't say that, sir. I said it has an effect upon it. When you pull water out of the river above the dams, you can't help but affect the generating capabilities, especially in the time, the critical period, when we need water to sprinkle with.

Q And when is the critical period?

A June, July and August.

Q And is that the high generation time? Is that when they need the water to generate?

A Well, not normally in Montana. I would presume that the heaviest loads that Montana Power would anticipate would be in the winter months. However, as we put more sprinkler equipment on the line, their summer load would come up accordingly. But what I'm really saying is if I keep putting in sprinkler irrigation equipment and pulling water out of the rivers, then pretty soon the water isn't in the river to generate with, so then we've got to go find another alternate source of power.

Q Has somebody told you that taking the water out of the river for sprinkler purposes somehow affects the hydroelectric generation?

A Well, sir, I don't think anybody has to tell me that; I can look and see it, and I think you could, too. If the water isn't there, how can you generate with it?

Q Well, unless you have some facts about that, I don't want to speculate myself as to whether it has an effect. I'm asking you if you have any facts on which you base this statement. In other words, you know we store water, and we use water at different times of the year, and I can certainly appreciate there's a good deal of water that goes down the river and out into the ocean; so it is not inconceivable in my mind that we're not using the same water to irrigate with that we're using for power. In other words, that we have different allocations of it. I'm also aware that some irrigated water comes back into the river.

A That's right, sir.

Q So I'm asking you what facts you have, if any, that the taking of water for sprinkler irrigation affects the hydroelectric needs of this country?

MR. ROSS: I'm going to object. I think that's repetitious. The witness has testified that his basis is his opinion and his general knowledge.

HEARINGS EXAMINER: Overruled, you can clarify it if you want to. You can answer, sir.

A Well, I would say something like this. Of course, I live at Great Falls, and Montana Power has some dams on the Missouri River in that area, and during the low water periods when we're sprinkler irrigating, I know that they're not spilling any water at those times. And what I mean by that, they're not putting any water over the spillways, so that means that there is no surplus water going over; it's all having to go through the power plant. Now if I keep putting sprinkler irrigation equipment in upstream of those dams, something is bound to happen.

Q Do you know what's going to happen if you do that?

A Wouldn't there be less water, sir, if I'm pumping it out?

Q Well, do you know where the water comes from that goes down that river in June, July, and August?

A It's coming from upstream, Holter and Canyon Ferry.

Q And do you know how it gets out of Canyon Ferry?

A I suppose they let it out.

Q Right. In other words, it's controlled, Mr. Lowry, and if you take some out, they're going to let more down, I guess. In other words, they're not going to have no water there because you take it out; they'll put more water in. Do you understand that?

A Oh, I think that's right.

Q Now I want to know if you have any facts, or is this just your opinion?

A I said that a minute ago; it's my opinion, sir.

Q Okay. Now then, Mr. Lowry, there's been a lot of testimony here by the opponents of these plants that we have no objection to the coal being moved to the Pacific Northwest to build a generating facility necessary to supply the electric power to the Pacific Northwest. Do you have any argument with that viewpoint?

MR. ROSS: I'm going to object. That's beyond the scope of rebuttal and certainly beyond the scope of redirect.

HEARINGS EXAMINER: What was the question again, Mr. Graybill?

MR. GRAYBILL: I'll explain the question so the

Hearing Officer and Mr. Ross will understand it. He said that there's going to -- Mr. Ross on redirect raised an issue which I had not raised, namely aluminum shortage; and I want to talk now about whether we can use the coal to make power to supply the aluminum companies in Washington or Oregon, and it's right directly on his point. He's the one who has, you know, enlarged the scope here, and perhaps I should have objected, but that's the point of the question. Now the question is that there's been testimony here that many of the opponents do not object to moving the coal out of the state of Montana to Washington or Oregon and building a plant to supply power for aluminum industries and other needs near the need, near the power need. Do you have any objection with that -- do you have any quarrel with that viewpoint?

HEARINGS EXAMINER: Okay, now make your objection.

MR. ROSS: And I object. It's beyond the scope of rebuttal and beyond the scope of redirect.

HEARINGS EXAMINER: Overruled. You can ask if he has any quarrel with it. You can answer.

A Okay. Well, my only, this is an opinion now and some things that I've read, but I think it's a little bit absurd to haul millions of tons of coal all the way to Seattle, Spokane, or Tacoma, Washington, or some other place and burn it over there. Eventually, the air over there gets over here. We haul all that coal all the way over there. I forget how many, I have no idea of the amount of diesel fuel, for instance, that would be required for the trains to haul that coal. It just seems asinine to do that to me when it's so much cleaner and cheaper to ship the power on a line.

Q Is it any cleaner to burn it in Colstrip than it is to burn it in Seattle?

A None, sir, but I just got through saying how many millions of gallons of diesel fuel alone it would take for the locomotives to pull the trains over there.

Q Well, now, Mr. Lowry, there's been testimony -- you know, you're talking about opinion and perhaps we should ignore it, but there's been a lot of testimony here that some of those power plants over there move the power more cheaply and with less total energy loss by rail. There's a Portland General Electric plant, for example, that has a better cost factor than the Colstrip plants and moving coal from Wyoming. Let's assume for a moment that the evidence was that it would be equal.

A Okay.

Q It wouldn't cost more to move it there than it would here. You understand there's a loss in moving the power by electric line, too?

A Oh, yes, sir.

Q And now assuming that it doesn't matter costwise, do you have any real objection to moving the coal to the Pacific Northwest in order to burn it and make aluminum out of it?

A No, I wouldn't have any objection to that. I guess my opinion is that we need the energy, and I don't care where it's at; we need it.

Q I understand your position. Now then you talked about a form of sprinkler called a traveling big gun?

A Yes.

Q How high does a traveling big gun throw water in the air?

A Well, of course, there's more than one type of nozzle for that, sir, and that would also depend on the -- what I mean by the nozzle is the angle of trajectory. There is 22 degree angle, 27, 24 degree trajectory guns. You can also change it by changing the ring nozzle in the end of the gun, and you can also change it by the pressure.

Q Well, I presume, Mr. Lowry, I don't think you've answered my question, but I'll keep at it. I presume that the distance you can throw the water and the amount of land you can irrigate is somewhat a function of how high you arc it?

A No, not necessarily.

Q That plus the pressure, right, plus the type of nozzle, all of those things?

A Well, the pressure is more important than anything. Sir, if you get the angle too high, 27 degrees, especially in this windy country, you find that the water goes up and straight back with the wind.

Q Well, I understand that. Now how high is the traditional or the typical traveling big gun, how high does the nozzle sit off the ground?

A Oh, on this model 3300 Hinesman here, for instance, it's about six feet to the top of the nozzle.

Q About six feet to the top of the nozzle. Now how high does it throw the water, if you know?

A Well, with the 27 degree, which is the highest angle we could throw it at, at about 90 pounds, it would throw it about 40 feet in the air.

Q So you'd have to modify your system if you're going under a 35 foot electrical --

A I wouldn't put it there, sir.

Q I thought you said in answer to Mr. Ross that this was one of the two kinds that you thought could be used under the power line?

A I said this is some of the different types of equipment we have available, sir.

Q Oh, so you're not suggesting that a traveling big gun be used under the power line?

A I'm not suggesting, I don't suggest any type of equipment until I go look at the field, and we design the system. The farmer himself has a great deal of bearing on what kind of gear I'm going to put in there.

Q Sure, I understand that, Mr. Lowry, but Mr. Ross did ask you a specific question, and he asked you what types of equipment could be used around the power lines, and you gave him two examples, traveling big gun and hand carried lines. Now are you saying that you're now changing that answer and that traveling big guns would not be used in your -- that is, that you wouldn't recommend their use under the power lines?

A It would depend on where I was going to put them at in relation to the power line. The center pivot, for instance, in this picture here shows it gone on the end. This machine here it's 12 feet to the sprinkler pipe which is the top of the towers. It has a gun on the end, and I know where there are some of those machines that are shooting right at the poles.

Q Do you know what happens if you sprinkle water on a high tension power line?

A I think it would have a big effect on what the voltage was on the line, sir.

Q Do you know, or again is this your opinion?

A No, I said it would have a great deal of bearing on what the voltage on the line was. If you had a 250,000 volt line, I'm sure it would be more dangerous.

Q Well, let's assume you had a 500 kv line, which is what we're talking about here, Mr. Lowry. Do you know what the effect is if you shoot water on it?

A I'm not an electrical engineer, sir, and I suppose the density of the water would enter into it.

Q I'm not interested in what you suppose. I want to know if you know the effect?

A No, I do not.

Q Okay, that's what I thought. I just have one other question, Mr. Lowry, and that is this: In irrigating a field for a particular crop, or in irrigating an area, you would be limited, would you not, by the amount of water available at the critical time, that is when the water is the least available? That would limit the amount of area you could irrigate regardless of the nature of your system, wouldn't it?

A Yes, sir.

Q So any project that tends to involve in any manner the amount of water available at the critical time, I'm talking about August, for example, is going to have some affect on the amount of land that can be irrigated; isn't that right?

A That would be true, sir.

Q And to the extent that that's true, it doesn't matter how much land you have available or how much power you have available if you don't have enough water available, it doesn't matter that you have other potential land to irrigate or other power to do it with, does it?

A No, but I think the area of underground water in Montana has scarcely been scratched.

Q Nevertheless, wherever the water comes from, whether it's underground or river water, the limiting factor is the amount of water available in the critical time; isn't that right?

A That's right, sir.

MR. GRAYBILL: That's all.

HEARINGS EXAMINER: Mr. Ross?

Rebuttal, Re-redirect, by Applicants

By Mr. Ross:

Q Isn't it your opinion that the use of water and the use of land can be compatible with the construction of generation plants like Colstrip 3 and 4?

A Yes, I do.

MR. ROSS: No further questions.

MR. GRAYBILL: Well, I have to ask one then.

Rebuttal, Re-re-cross, by Northern Plains Resource Council

By Mr. Graybill:

Q You mean that -- what do you mean compatible? Compatible in the area where the plant is built; is that what you mean?

A I guess what I meant by that, and I think Mr. Ross's question was can they live together harmoniously, and I think yes, they can, whether it's in the area of the plant or whether it's 20 or 30 miles away or in the northern part of Montana.

Q Well, but of course, isn't it true, Mr. Lowry, that the answer to that question really depends on a number of variable factors like the one I just mentioned, the amount of water available in the critical period, the amount of pollution caused by the plant, the amount of water, or the amount of land withdrawn from agricultural use by the needs of the plant. All of those things would have to be considered before you'd know whether they could live together, wouldn't you?

A Well, yes, I think you're right there, but I still think that they can be made to live together, and I think they will be made to live together.

MR. GRAYBILL: All right, thank you, Mr. Lowry.

WITNESS: Thank you.

HEARINGS EXAMINER: Very well, you're excused, sir.

WITNESS: Pardon?

HEARINGS EXAMINER: You're excused, thank you.

(WITNESS EXCUSED)

HEARINGS EXAMINER: You want to have a short recess or you want to continue? All right, fine, call your next witness.

DR. CARLTON D. GRIMM, called as a rebuttal witness by the Applicants, having been previously sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

MR. PETERSON: On page 6, at line 9, the word less, l-e-s-s, should be inserted between the words far and stringent so that the end of that sentence reads far less stringent than ours. At this time I'll move into evidence the Applicants Exhibits 277, 278, and 279.

MR. SHENKER: I don't have a copy of 277, Jack. I have 278 and 279.

(THE WRITTEN DIRECT TESTIMONY OF DR. CARLTON D. GRIMM WAS DIRECTED TO BE INSERTED AT THIS POINT.)

TESTIMONY OF

CARLTON D. GRIMM

I am Carlton D. Grimm. I received my undergraduate degree from Montana State University in chemical engineering and my doctorate from the same school in 1971. My employer has been The Montana Power Company since 1972. I am an associate member of Sigma Xi which is the Scientific Research Society of North America, and also an associate member of the American Institute of Chemical Engineers. Prior testimony was given by me at the Board of Health portion of these proceedings.

My continuing testimony is a report on the emissions from Colstrip Unit No.1. February 10th through February 13, 1976, the commercial testing firm of Yapuncich, Sanderson and Brown, Billings, Montana, conducted a source test of Colstrip Unit #1 alongside testing personnel from the Montana State Air Quality Bureau of the Department of Health. Results are now available from the testing firm for particulate, sulfur dioxide and NO_x. (Applicant's Exhibit #278). These tests show all applicable emission standards have been met by substantial margin and confirm our prior testimony on predicted emissions. The attached Table A lists the results for the four days of testing. Particulate emission was 0.027 pounds per million, British Thermal Unit (lb/MMBTU). This should be compared to the Federal New Source Performance Standard (NSPS) of 0.1 lb/MMBTU or 73% below the standard. Sulfur dioxide emission rate was 0.44 lb/MMBTU; the NSPS value is 1.2 lb/MMBTU or 63% below the standard. NO_x emission rate was 0.26 lb/MMBTU while the NSPS value 0.7 lb/MMBTU, or 63%

below the standard.

When one takes the coal analysis data for the time period the testing was underway, particulate removal efficiency was 99.74% overall because the average ash content in the coal was 10.42 lb ash/MMBTU while the outlet ash content was 0.027 lb/MMBTU. Similar calculations for the total removal of sulfur were carried out and the removal efficiency was 75 percent based on 0.88 lb S/MMBTU in the incoming coal.

The coal burned during the testing period, February 10 through February 13, has the characteristics as listed on Table B. As the samples were taken from the pulverizer discharge, they had been partially dried so the oven dried readings have to be corrected back to the average moisture content of samples taken from the coal silos and conveyor belts. Samples at these locations were taken before and after the dates of the testing period and are shown on Table C.

Table D presents the emission comparisons between the test results from February 10 through 13 and the testimony given during the Board of Health hearings for Units #1 & #2. (Applicants Exhibits 61 and 62)

The scrubber system, however, was operated at a ph of 4.2-4.4 during this test.

The monitors in operation during test period showed the outlet SO_2 concentrations to be well within our predicted maximum limits and consequently it was not necessary to increase the ph factor.

Review of the data submitted to the Department of Health which is accumulated hour by hour at Unit #1 from the stack monitors for sulfur dioxide, NO_x, and opacity has shown that overall operation of Unit #1 is consistent with the tested performance of Colstrip Unit #1 presented in this testimony.

Opacity readings as determined by a professional observer ranged from 5.8 to 13.3 when the particulate test was in progress February 11, and from 6.2 to 14.6 when testing resumed on February 12. The state and federal standard requires 20% opacity and thus the opacity standard was clearly met. Applicants' Exhibit 279 is the opacity report.

Availability for the scrubber system is defined as the hours the scrubber was available for operation divided by the total time period hours. The availabilities were 91.8 percent for January 1976 and 98.44 percent between the 1st and 23rd of February, 1976.

Best available control technology is defined by the Federal Regulation as "...any control device or technique which is capable of limiting emission to the levels proposed or promulgated pursuant to Part 60 of this chapter (Federal Register, December 5, 1974, Vol. 39, Number 235, Part III, Prevention of Significant Air Quality Deterioration, 52.01.) This definition has been adopted by the Board of Health on September 5, 1975. See 16-2.14(1) - S14082, Montana Administrative Code.

The best available technology is synonymous with highest state of the art and is that technology tailored to the specific site constraints which include the nature of the coal burned, meteorology of the area, evaporation potential, available ash disposal site and water availability. The state of the art for flue gas desulfurization must be examined for each particular situation. For example, a system employing soda ash for SO_2 removal may be the highest state of the art and best available technology for that specific situation where soda ash is readily available and site constraints permit its use; another system may use a regenerable FGD system if the plant site is limited in size and no disposal area is available, while another system may use the ash present in coal if alkaline in nature to minimize dependence on lime addition and avoid scaling problems. Economics must also enter into the selection of which technology to use. A system must be designed to meet the applicable standards which thus creates by itself minimum adverse environmental impact since the standards protect public health and welfare with an adequate margin of safety, give reliable operation, and not create excess costs that would be passed on to the consumer.

The Opponent's witness, T. W. Devitt, recently compared the Colstrip sulfur dioxide removal system to other systems based on data collected by his company and reported in their PEDCO bimonthly report, DNR Exhibit 140. In connection with my regular business duty to keep abreast of and implement pollution control technology, I attended the EPA's sixth Flue Gas Desulfurization Symposium held in New Orleans, Louisiana, from March 8-11, 1976. This was a major national conference with about 800 attendees representing users, consultants, government agencies and suppliers. Thirty-seven papers were presented and discussed from the floor, including one paper on the PEDCO report by Gerald Isaacs, an official of PEDCO-Environmental Specialists, Inc. Dr. Isaacs was asked how his company verifies the descriptive data they publish in the report, following a statement that the report contains numerous discrepancies. He did not describe any verification effort, and stated publicly from the platform that discrepancies were unavoidable with over 100 people contacted. He further stated in answer to another question that information from suppliers sometimes conflicts with information from the utilities.

Based on my own experience, including contacts with other utilities and consultants and a continuing review of the literature, confirmed by the most recent industry conference, I can state the PEDCO report (DNR Exhibit 140) provides useful general information but it is impossible to use the report to make a meaningful engineering comparison of different systems because of possible discrepancies and a lack of detail, including important site specific conditions.

The system proposed for Colstrip is based on numerous conditions specifically applicable to this site. These were described in great detail in testimony earlier in the proceedings. Significant factors that would prevent direct application of any of the systems listed in DNR Exhibits 140 include the site specific nature of the fuel and the ash it contains, and the requirement to avoid the release of waste water.

An example of misleading information in the PEDCO report is the reference to 40 percent SO_2 removal for Colstrip. This figure was qualified earlier in these proceedings as a number that could be calculated from the supplier's outlet commercial guarantee from average inlet conditions. It is substantially less than either the calculated figure at worst inlet conditions or the performance actually exhibited by the system and its pilot plant.

PEDCO has never requested sufficient information to properly qualify their publication of this information and anyone drawing conclusions from their report would be misled.

Another example is the Cholla plant which I personally visited. PEDCO reports 90 percent SO_2 removal and 100 percent availability recently; it took over two years with availabilities in the 50-60 percent range to reach this recently claimed performance and this availability is based on a PEDCO definition of availability far less stringent than ours. As for SO_2 the total system has never performed at 90 percent removal and to extrapolate this performance to a full scale unit without additional tests is unsound because liquid to gas ratios and retention time would be significantly affected. Further, this system is open loop which affects the process chemistry.

Dr. C. C. Gordon has testified that the Corette 180 M.W. generating station at Billings contributed to 50 percent of fluoride damage found by him at Sacrifice Bluff (GB 1 - Snook Property). According to the official report of the Yellowstone County Air Pollution Control Status Report, issued December 1974 for the fiscal year 1973-1974 by James L. Glenn and others, the board staff concludes at page 21:

> "In the past there has been a great deal of controversy over just who might be responsible for the high concentrations of fluorides in the Yellowstone Valley. Data from the Laurel area makes it painfully apparent that fluoride levels are directly attributable to refinery operations in both the Billings and Laurel

> areas. It is also apparent that all concerned have been as remiss in our duty to reduce concentration of fluoride as we have been successful in the reduction of other pollutants present. Reduction of fluoride emissions should be an area of highest priority during this year.

The report is marked as Applicants Exhibit 277 and clearly shows that fluoride concentrations exceed the Montana standards substantially and their source is not the power plant.

The SO_2 emissions from the Colstrip Units 3 and 4 will be reduced to the minimum value attainable with presently available technology specifically designed with consideration for all site conditions including the nature and economics of available alternatives and nature of the fuel and impacts of water disposal, and therefore will result in the minimum adverse environmental impact upon the citizens of this state and the specific area.

TABLE A

Results of Source Testing
Colstrip Unit #1
February 10 Through February 13, 1976

I. Particulate

Test	1	2	3
Total Emission (lb/hr)	88.4	93.7	88.3
Filter (lb/hr)	77.4	85.8	75.3
Probe & Cyclone Washings (lb/hr)	11.0	7.9	13.0
Firing Rate (Btu/hr)	3349.7×10^6	3334×10^6	3345.8×10^6
Particulate Emission (lb/million Btu)	0.0264	0.0281	0.0264
Average		0.027 lb/million Btu	
Standard - Federal NSPS		0.1 lb/million Btu	

II. Sulfur Dioxide

Test	1	2	3	4
Total Emission (lb/hr)	---	1507	1368	1520
Firing Rate (Btu/hr)		3337.5×10^6		
SO_2 Emission (lb/million Btu)		0.45	0.41	0.46
Average		0.44 lb/million Btu		
Standard - Federal NSPS		1.2 lb/million Btu		

III. NO_x

Date	2/10	2/11	2/12
Tests		NO_x (lb/hr)	
1	966	---	806
2	1091	783	826
3	1103	780	882
4	975	760	813
Average (lb/hr)	1033.75	774.33	831.75
Firing Rate (Btu/hr)	3349.7×10^6	3334×10^6	3345.8×10^6
NO_x Emission (lb/million Btu)	.31	.23	.25
Average Over Three Days of Testing		0.26 lb NO_x/million Btu	
Standard - Federal NSPS		0.7 lb/million Btu	

TABLE B

Coal Analysis Data
Samples From Pulverizer
Values Corrected to
Average as Received Moisture Content

Date					
2/10	% Moisture	25.455	25.455	25.455	25.455
	% Ash	8.70	9.12	9.09	9.13
	Btu/lb	8,678	8,617	8,656	8,634
	% Sulfur	0.83	0.88	0.83	0.91
2/11	% Moisture	25.455	25.455	25.455	25.455
	% Ash	9.00	8.60	9.27	8.90
	Btu/lb	8,614	8,710	8,597	8,652
	% Sulfur	1.02	0.87	0.93	0.84
2/12	% Moisture	25.455	25.455	25.455	25.455
	% Ash	9.07	9.03	9.26	8.89
	Btu/lb	8,639	8,658	8,608	8,669
	% Sulfur	0.72	0.65	0.85	0.75
2/13	% Moisture	25.455			
	% Ash	8.98			
	Btu/lb	8,632			
	% Sulfur	0.76			

Composite of All 13 Samples

% Moisture	25.455
% Ash	9.03
Btu/lb	8,638
% Sulfur	0.83

TABLE C

Coal Analysis Data

Date	2/8	2/11	2/14	2/16	Average
% Moisture	25.78	25.17	25.41	25.46	25.455
% Ash	8.48	9.20	8.81	9.97	9.11
Btu/lb	8,644	8,669	8,670	8,517	8,625
% Sulfur	0.59	0.71	0.80	0.72	0.705

TABLE D

COMPARISON OF EMISSION DATA

	Emission (lb/Hr)		
	Parti-culate	SO_2	NO_x
Unit #1-Actual Performance	91.4	1464	880
-NSPS (Standard)	339	4063	2370
Units #1 or #2 Projected Emission			
*Based on Area E Coal (.78% S-average)	130	1394	2370
*Based on Area E Coal (1% S-worst condition)	184	2071	2370
Units #3 or #4			
Performance based on Unit #1 Test	204	3274	1968
*Based on Area C Coal-worst condition	329	4633	5301
*Based on Field Average Coal (.81% S)	308	3296	5301
*NSPS (Standard)	757	9088	5301

Expected Annual Emissions based on Performance Test Data for all 4 Units would be (Tons per Year):

	Performance	NSPS Standards
SO_2	41502	115202
NO_x	24948	67198
PARTICULATE	2588	9602
FLUORIDE	22.8	(Based on Testimony, Vol. 13, pp. 1789-1790- Board of Health- no emission standard for Fluoride has been adopted)

All Annual emissions are calculated at 100% load, 24 hours per day, 365 days per year, normal load factors would reduce each figure by 80% or less.

*Testimony before Board of Health

EXAMINATION OF DR. CARLTON D. GRIMM

Rebuttal, Cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q Dr. Grimm, is the Colstrip unit 1 still down?

A To my knowledge, yes.

Q When did it go down?

A I believe it went down last Wednesday about noon.

Q Why did it go down?

A We had a problem with the circulating water pump. A piece of foreign metal got into the pump, and it's a mechanical problem.

Q And that required shutting down the entire unit?

A Well, they had to get the unit shutdown to de-water one of the pits to get at the pump and repair it.

Q The answer is yes?

A They could have operated it at half load for some time.

Q But they did not?

A And they elected not to, they elected to go down and repair the pump so that they could retain full load capability of the plant.

Q Well, as long as the unit was down, of course, it gave you an opportunity to look inside the boiler and see what you could find, didn't it?

A Yes.

Q What did you find?

A We were aware that there was a clinker in the boiler.

Q A clinker? What's a clinker?

A A clinker is a -- well, it's a form of slag, it's a slagging of the boiler.

Q Slagging, that's some kind of solid deposition?

A It's a solid -- well, it's like a large rock; it might be best to define it that way.

Q Okay. How were you aware of that?

A How were we aware of the clinker?

Q Yes, sir.

A We had been aware of it for some time that we had some slagging in the bottom of the boiler.

Q How did you know that?

A So they were taking action when this shutdown came because of the circulating water pump to go in and clean out the clinker.

Q How did you know before you shut down the unit last Wednesday that you had this solid material inside the boiler?

A There's observation ports in the bottom of the boiler, and when they're pulling ash they look in the observation ports, and they can observe if there is any hang-up in the bottom.

Q How long had you known that?

A We had been aware -- oh, I can't give you a definite time period, but we had been aware that there had been some slagging for the last month, a month or so, in the bottom of the boiler, and it just turned out that this time was a convenient time to get in and work on it and move it out.

Q Were you aware of the fact of the slagging, as you put it, as of February 10, 1976?

A There may have been a deposit at that time, or even prior to that time.

Q Were you aware of it personally?

A Time passes quite fast, and I probably was. I cannot say definitely that I was aware exactly of that at that date.

Q You were on site, were you not, from February 8 through February 13, 1976?

A I was on site on a Monday, and I'm not sure if that was the 9th, the 10th of February, and I left the site on Friday, the 13th.

Q All right, sir. During the time that you were there, were you then aware of the slagging inside the boiler?

A I'm still trying to think back in time to that specific item. I knew we had had seen slagging in the bottom of the boiler. Whether we had a large clinker that time I don't know; I just can't remember.

Q When you did open up the boiler and take a look see inside and go in to clean out the slagging that was there, what was the size of what you describe now as a large rock?

A I don't know. I didn't get into the bottom of the boiler, and I did not clean it out, and I haven't been aware of all the particulars of it, so I can't describe to you any physical size.

Q Was Mr. Berube there?

A No.

Q Would it surprise you to have found when you got into the boiler that there was a cone of solid fly ash 85 feet tall in the boiler?

A Yes, it would surprise me.

Q Now if, of course, you had any solid deposition of anything like the size that I just described, that would tell you rather vividly, wouldn't it, how efficient you were in the collection of particulate material?

A Are you asking a question or making a statement?

Q Yes, well, I said wouldn't it?

A It depends upon how long it would take for this deposit to build up in.

Q Well, how long would that take?

A I don't know, I really don't know how long. You mention a specific size, I don't have any facts to verify whether it was the size that you indicate or somewhat different.

Q Whatever the size was, of course, it could not have been building up prior to October of last year, could it?

A No, the plant wasn't in operation until the latter part of September, early part of October of 1975.

Q So if you've been collecting particulate matter with the control system at the Colstrip unit number 1 and, in fact, there is a solid deposition of material inside the boiler, what you've actually been doing is collecting the material and depositing it in the boiler; isn't that right?

A Our design is based upon --

Q Well, is that correct or is it not?

A Would you repeat your question, please?

(Question read back)

A We've always stated that we do collect slag in the bottom of the boiler, so there is some particulate removal, some removal of the ash through the bottom of the boiler, just as a certain portion of the ash goes overhead towards the scrubbers.

Q Would you expect to find problems of corrosion in your equipment for pollution control at Colstrip 1 in a period of less than six months in operation?

A When we look at our --

Q The answer to my question is yes or no, and then you may explain your answer.

A Yes, we could see some problems with corrosion in equipment in six months operating time, and we do look into our system any opportunity that we have. We check for corrosion. If we detect any, let's say there is a problem with flakelining on some of the carbon-steel surfaces where flakelining is applied, we get in and patch it. To my knowledge, we have not had any problems with corrosion.

Q How about erosion; you wouldn't expect that to occur within six months of the operation of your system, would you?

A Well, no, with our system, we have a well-designed system where we have taken particular pains to put the right materials in, and with these materials, selection of the materials for the scrubber use, correct selection of these materials, we wouldn't expect to see any corrosion. However, again --

Q No, the word was erosion that I was using?

A Excuse me, erosion, yes. Again, any opportunity that we have, we will get in and take a look for it.

Q Could I ask you whether you would or would not look?

A I'm just explaining my answer.

Q Why is that an explanation to whether you had it or you wouldn't have it?

A Well, I feel that it's necessary to put on the record exactly what we've been doing, what we plan to do.

Q Well, that's what Mr. Peterson is here for, to help you tell your whole story to the board. If you need to explain an answer to a question I put, you know what that means, Dr. Grimm; we don't need propaganda.

A I'm not giving you propaganda, sir.

Q Good. Now no one in his right mind designs any kind of a pollution control system which could erode in less than six months when the system is designed for a life of 37 years; isn't that correct?

A I should hope not.

Q All right. What you have provided for us, Dr. Grimm, in your testimony is some data on a test that occurred over a period of some four days in February which I take it to be the first test that you have made of the efficiency of the operation of Colstrip 1 pollution control system; is that right?

A Yes, this is the first test conducted under EPA methods by six and seven for SO_2, NO_x, and particulate.

Q Have you conducted any tests under any other methods prior to that time on the operation of Colstrip 1 to determine its efficiency of operation?

A We have not had any formal testing; however, we do have our monitors on the system.

Q All right. Now let's see if we can't simplify for the purposes of this Board of Natural Resources and Conservation what's involved in looking at that pollution control system's operation since we are not here today before the Board of Health and Environmental Sciences to determine compliance with federal and state standards. If you will assume with me, Dr.

Grimm, that we have a box, and we are trying to find out how much smoke that we put into the box is kept from coming out of the box. A way to make that determination is to determine how much smoke is going in and determine how much smoke is going out and the difference is what you have collected with whatever system you have of keeping the smoke from coming out of the box, right?

A I follow your assumption.

Q Okay. Now that would be a way to test smoke in, smoke out from box, correct?

A That's one way, yes.

Q Now in a power plant such as the one you have operating as Colstrip number 1, it's not just a plain, simple, ordinary box; it's a little more complicated than that, of course, but essentially that's what you're trying to find out, isn't it?

A What are we trying to find out?

Q Oh, come on, Dr. Grimm, you know what we're trying to find out. How much junk are you putting in and how much junk are you keeping from going out from the plant?

A What these tests were set up to do is to prove what the emissions were on Colstrip unit 1.

Q All right.

A We're testing for emissions, and this is what the regulation calls for.

Q Let's be perfectly clear. At no time did you test to determine how much junk is going in by actual measurement at any place in the inlet to your pollution control system; isn't that correct?

A We tested what was going into the system, the total system; we made coal analysis out of the pulverizers so we know the ash and the sulfur going into the boiler.

Q Dr. Grimm, did you understand my question?

A I'm answering the question the best way I can.

Q Do you know what an inlet is?

A Inlet to what?

Q To your sulfur oxide removal system?

A It depends on where you want to take the inlet. The inlet to it is -- you can even take just the air coming from the, the ambient air going into the system; that's an inlet.

Q Let's not play games, Dr. Grimm. We've had great expanse of testimony and lots of exhibits, many of which came from you, in which you draw charts of what your pollution control system looks like. Now there is an inlet to that system, isn't there?

A Certainly.

Q All right. And one could measure to determine what the sulfur oxide component is going into the system; now that's possible, isn't it?

A Yes.

Q And you did not do that, did you?

A At this test no, we did not.

Q All right.

A The aim of the tests, again, were to test the emissions.

Q Well, Dr. Grimm, I'm really trying to get a clear record here, and it's helpful if we have a yes or no to a question that I'm trying to make as clear as possible. To the inlet of your

SO_2 system, did you or did you not make actual measurements of SO_2?

A We did not test with a respective EPA method on the inlet to the scrubber for sulfur dioxide.

Q Or any other method?

A However --

Q Or any other method?

HEARINGS EXAMINER: Now let him explain.

A However, we did make coal samples, we did take coal samples on the inlet to the boiler.

Q We'll get to how you actually did do your tests; what I'm trying to find out for this record is how you did not do your tests, and what you did not do was to make any actual measurements to the inlet of your SO_2 system itself? Now that's correct, is it not?

A We did not make measurements with the EPA method, that's correct.

Q Or any other method?

A Well, which other method are you referring to?

Q Any other method in the whole world of the universe of known methods?

A Well, I have to restrict it to what the known methods are, and one of the recognized testing methods is this EPA method for testing for sulfur dioxide; and this is what I have, what I base my answer on.

Q Okay. You didn't use that method for the actual measurement of SO_2 at the inlet to your system, and you didn't use any other method for that purpose either?

A We do have stack monitors, or we do have inlet monitors to the sulfur dioxide removal equipment.

Q Did you actually measure in those monitors or in any other way in order to compare inlet with outlet?

A We do have data, we do have strip charts of the data for the inlet recorders.

Q Did you measure them?

A How do you mean measure them?

Q Well, have you provided us with any data by which we can determine how much junk you put in and how much junk you took out on the same day that you took your test by actual measurements at the inlet to the SO_2 concentration, at the inlet to the SO_2 pollution control system and at the outlet from that same system? The answer to that question is no, isn't it?

A No, I have not given it to you in that form; I've given it to you on the inlet to the boiler and the outlet through the stack.

Q All right. Now we will --

A I've taken the total system.

Q We will take a look at what you did do to make your measurements. Now it is also true, is it not, with respect to your particulate measurements that the same now somewhat laborious questioning that I have put to you with respect to the sulfur oxide system outtake?

A We did the particulate in the same method.

Q All right.

A Correction. We took particulate readings in the stack as by the EPA method, we know how much ash is going into the system based upon the inlet coal analysis.

Q Not by actual measurement?

A We did not take particulate measurements at the inlet to the scrubber.

Q Well, the fact of the matter is, isn't it, Dr. Grimm, as is well known to people who monitor efficiencies of operations on particulate collection systems that if you don't take the actual measurements, your test is a bunch of garbage; isn't that true?

A No, it's not.

Q All right. Let's start with your sulfur oxide system. You state an efficiency of the removal of sulfur oxides on the method that we have described so far in your testimony at 75 percent?

A I testify that, if I may read from my statement on page 2, similar calculations for the total removal of sulfur were carried out and the removal efficiency was 75 percent based on the .88 pounds of sulfur per million BTU in the incoming coal.

Q Well, that's very careful. You've now read it almost with the same inflection as the written words would provide, but let me ask you the question, Dr. Grimm. Does that mean that on these tests you were 75 percent efficient in removing sulfur oxide from your system?

A Essentially, yes.

Q Okay. Where in Exhibit 278 can we find that figure?

A In figure 278?

Q In Exhibit 278?

A In Exhibit 278 they just report on the sulfur dioxide measured in the flue gas exiting the system. The report also gives the pounds of sulfur dioxide emitted in pounds of sulfur dioxide per million BTU; this is how it's reported.

Q Can we find the 75 percent figure anyplace in the testing laboratory's report which is Exhibit 278?

A No, it is not in there, and you have to put together -- well, the basic information is in there, the percent sulfur in the coal and the sulfur dioxide coming out of the stack, and you have to make some further calculations.

Q Let's make some calculations.

(Mr. Shenker goes to drawing board.)

Q Now, Dr. Grimm, one way to have calculated what your efficiency is is to determine the pounds per hour of your coal consumption, multiply that times the factor 1.9 to convert from sulfur oxides, from sulfur to sulfur oxide, multiply that times the percentage of sulfur in the coal on an as received basis, and that will give you the pounds per hour of sulfur oxides going into your, what you call, total system on a calculated but not measured basis, won't it?

A Well, that possibly is one way to do it.

Q Okay.

A The coal consumption figures that appear in these reports, we have some qualifications on them.

Q Yes, tell me about those coal consumption figures, Dr. Grimm, in that they appear to be substantially higher than anybody had projected before Colstrip 1 went into operation; isn't that true?

A The coal consumptions that I relayed to the testing laboratory and also to the state I put qualifiers on the total figures, and the reason I did this was the difficulty in measuring the amount of coal going into the boiler during the time of the tests.

Q What kind of qualification did you put on it?

A The qualifications were that from my observations, they appeared to be about 10 to 15 percent high. We had several different ways that we measured the coal. One way gave about 20 percent low, another one gave about, like I say, 10 to 15 percent high. We were not able to get consistent coal consumption, or coal feeding, values, so this information was given to the state just for informational purposes.

Q Now, Dr. Grimm, before Colstrip 1 went on stream, what were your calculations of what you expected to have by way of coal consumption per hour?

A I'd have to go back and review the exhibits and the testimony that was given before to give you the accurate figure.

Q Well, give me an approximation then?

A My recollection is that it would be in the neighborhood of around 195 to 200 tons per hour at full load.

Q Okay, let's take a look, Dr. Grimm, at what a calculation would result in with figures that I will put on the board.

(Pause)

Q One hundred ninety-five tons is three hundred ninety thousand pounds, isn't it?

A Yes, it is.

Q Okay, and if you had a sulfur content of 9 percent, that is nine-tenths of one percent in the coal, but you believe that there may be some 25 percent moisture in it, then you would have to multiply nine-tenths of a percent times .75 in order to determine what you thought your sulfur content was; would that be correct?

A I believe I'm trying to figure out what you're doing on the board, and I'd have to write down all the units and figure out if the unit equations balanced, and when you put up calculations like this in front of me --

Q They're the same ones that I read to you that you told me were one way to do it. Is 396,000 pounds per hour of coal consumption times 1.9 which is the factor of conversion from sulfur to sulfur oxide times .009 which is nine-tenths of one percent for the sulfur content of the coal times .75 which is an allowance for moisture in the analysis of the sulfur content of the coal, right?

A I follow what you're saying.

Q Okay. Now if we multiply that out, that's around 5,000 pounds per hour, wouldn't it be?

A I haven't made the calculation, and in this day of calculators I don't even trust my slide rule anymore.

Q We've got a calculator around here someplace, but trust me that it's around 5,000 pounds per hour. The mathematics will eventually be done if necessary. You have to subtract from the 5,000 pounds per hour in order to obtain the numerator of your efficiency ratio, the measured average SO_2 stack emission; now that was measured, wasn't it?

A Yes, the figure was given for the emissions.

Q Yes, and that figure was 1,759 pounds per hour, wasn't it?

A The figure that we're using is somewhat different, and if I may quote the three tests I reran, three of the four tests, number two test was 1,507 pounds per hour, number three test 1,368 pounds per hour, and number four test 1,520 pounds per hour.

Q That's kind of interesting.

A That's a lot different number than what I have on my testimony.

Q Yes, but you have seen the number 1,759 before, haven't you?

A I've seen some figures that came out on the state report, yes.

Q Yes, the state's measurement showed 1,759 pounds per hour as its average figure from the same tests, or excuse me, tests taken at the same time as your tests were taken, right?

A You're quoting an average?

Q Yes.

A I did not carry out an average of their tests, so I'll just have to take your word for it.

Q All right. Now if we were to compute the figures that appear on the board now, we would then come to an efficiency of operation, wouldn't we, for the SO_2 removal?

A This is one possible way of calculating an efficiency.

Q Sure, and then you would come to an efficiency of something around 64 percent, wouldn't you?

A Well, my inspection figure is 63 to 65 percent.

Q Okay. Now these are known as tests done by extrapolated values, isn't that true?

A By whose definition? I'm familiar with all the words that you're saying, but I haven't really heard this as a way of describing a test.

Q Well, there are a couple of ways that you can describe categorically; one is by measured values, and the other is by extrapolated values. What I've just run through are extrapolated values, aren't they?

A Extrapolated from which?

Q From presumed coal consumption, from tested at someplace sulfur content of the coal, and presumed and tested moisture content of the sulfur content of the coal?

A And this is how you get your extrapolation?

Q Right. Is that right?

A It's one way of doing it, yes.

Q Okay.

MR. SHENKER: I will label this as DNR Exhibit number 40 for illustration, and then I will pass to you the marking pen and ask you to go to the board and tell us how you made your calculations.

(Witness complies.)

A What I used as I took the BTU value of the incoming coal and the percent sulfur in the incoming coal, and I got pounds per million BTU. If I can just put the equation, or I calculated it sulfur in pounds per million BTU into the system, and utilizing the report from Yapuncich, Centerson and Brown. I. can get the value for sulfur dioxide in pounds per million BTU out of system. I can convert that to sulfur in pounds per million BTU out of the system, compute efficiency by what goes in, subtract what goes out over the in times 100 percent, and that's how I obtained the 75 percent.

Q Did you put in the numbers?

A Okay, on the sulfur going in is 0.88 pounds sulfur per million BTU, on the outlet the sulfur dioxide was 0.44, so that's equivalent to .22 pounds of sulfur per million BTU, and divide it by 0.88, take it times 100, and that equals 75 percent.

Q Good. Now show me where you got the 0.88 million BTU in the Yapuncich Laboratory report?

A Well, we have to take the coal samples, and we take the coal samples for the 13th.

Q Why the 13th?

A The 13th was the day that the sulfur dioxide tests were run.

Q Okay. Where in Exhibit 278 are we going to find that material?

A There's a sample on page 16, a sample taken February 13, 1976.

Q Okay. What do you use; do you use sample 1-A, or do you use the composite analysis, or do you use the --

A I use the sample 1-A, the sample taken during the time of the test.

Q That says percent sulfur 0.82?

A That's correct.

Q Well, how do you get 0.88?

A I have to convert from percent sulfur in the sample to sulfur in pounds per million BTU.

Q Good. How do you do that?

A Okay, I take 0.82, I divide it by 9,355 BTU's per pound, put in an appropriate factor for pounds per million --

Q Who puts that?

A Well, 10 to the 6.

Q Okay.

A And you come up with the figure 0.88.

Q So you got 0.88 by dividing 0.82 by 9,355, is that right?

A Yes.

Q Okay. And how did you get the 0.22?

A 0.22? On page 1 of Exhibit 278, the report for Yapuncich, Centerson, and Brown, the list in pounds per million BTU, the sulfur dioxide emission of 0.439. When I did the calculations I used 0.44, and that's equivalent to .22 pounds of sulfur. Ratio of molecular weights sulfur has a molecular weight of 32, sulfur dioxide molecular weight is 64.

Q Well, it's not quite that, but it's pretty close, isn't it?

A You're very close, yes.

Q Yes, some folks use 1.9, some folks use 2.0?

A Well, I used 2.0 in these calculations.

Q Okay. Now if you look at page 10 of the Yapuncich report, Exhibit 278?

A Yes.

Q You see on February 13, the figure 3,337.5 under the equivalent to 10 to the 6 BTU per hour column?

A Yes, I do.

Q What does that mean?

A This is the heat input demanded by the plant at that specific load.

Q All right, then turn to page 11. Also on February 13, under plant input times 10 to the 6 BTU per hour column corrected by minus 10 percent?

A Yes.

Q That figure is 3,360.5. What is the relationship between those two figures that I have just asked you about?

A Okay. We gave testimony last summer in the Board of Health hearings on what a full load heat demand of this plant would be, and it was 3,386 times 10 to the 6 BTU's per hour. The 3,337 came from a pro rata share of 352.8 megawatts divided by 358 megawatts times this 3,386 times 10 to the 6, so that's how the figure is arrived at on page 10. On page 11 Mr. Yapuncich used the coal information that I gave him just for informational purposes only.

Q I don't quite understand that. What do you mean for informational purposes only?

A Well, we made coal readings. We were using a belt feeder, or a wave feeder, and we're gauging the tops of these silos that the coal goes into; and this is the best method that we had at that time for getting coal consumptions. However, after all the data was taken, and you can see the scatter of the data over, let's say, the four day testing period; we ran a number of particulate tests, NO_x, and SO2 tests, so we had four days of testing that we got some high values and some low values for coal consumption; and it's not what we expect to see. We expect to see figures somewhat below 200 tons per hour. The angle of repose on the top of these silos changes depending upon how the coal is feeding into the furnace and how low the silo level was before we started to fill it up, and we had to gauge this as a plumb line. It would give us a ball park value on the coal consumption, but nothing that we could really base any firm figures upon. So we did the best we could at the time. I told Mr. Yapuncich what figures we came up with, I also told Mr. Keltz over the phone, and then we wrote a letter to Mr. Roach of the Air Quality Bureau, and in the letter we used the figure, the pro rata share based upon the plant load at the time to what full load operation would have been.

Q What's the low range of what you would expect for coal consumption at full load?

A The low range?

Q Yes.

A Well, it depends upon the BTU value. I probably made some calculations at one time, and right now I can't give you any figure with any accuracy.

Q Well, I'm just interested in approximations. Would you say 150 tons would be the low range at maximum BTU content for the coal?

A For full load?

Q Yes, sir.

A No, I don't think you can go that low.

Q That would require a more efficient boiler than either you have or is made, is that right?

A Well, it would require a higher BTU value of the coal, a much higher BTU value.

Q Well, there are only two possible ways of decreasing the consumption of coal from the operation of your generating station: one is to have a more efficient boiler, and the other is to have higher BTU content in the coal; isn't that right?

A Yes, and I looked at the BTU value of the coal. The boiler design, as far as I know, is the state of the art right now.

The design that we have is the most efficient design based upon the current state of the art, boiler engineering, boiler design.

Q For coal-fired generating stations?

A Yes.

Q Now if you have your best design on the boiler efficiency and you have the same BTU content in the coal as was forecast, if you are actually consuming substantially more coal than you had forecast, that would mean that the boiler is not operating up to design, wouldn't it?

A That could be; I just don't believe that conclusion.

Q And the reason that you don't believe it is that you can't measure properly what the coal consumption is?

A That's correct. I worked on measuring the coal consumption, and it was a difficult job. We tried to obtain measurements over a long period of time, and they're just scattering results.

Q The less coal you consume, the better it is from your standpoint; isn't that true?

A Yes, it means that you're extracting the energy efficiently.

Q Yes, what do you think is the least you could possibly consume at full load? Is it 180 tons or 170 tons? Where in the ball park would it be, Doctor.

A The approximate range is between 190 and 200 tons per hour.

HEARINGS EXAMINER: Mr. Shenker, could we take a recess at this time and change our tape?

(RECESS AT 11:05 A.M.)

Following a brief recess, the hearing reconvened at 11:30 A.M. on March 23, 1976.

HEARINGS EXAMINER: Very well, we will continue.

CONTINUATION OF EXAMINATION OF DR. CARLTON D. GRIMM

Rebuttal, Cross, by Department of Natural Resources and Conservation.

By Mr. Shenker (continuing):

Q Dr. Grimm, for illustrative purposes, I've put the shell of another exhibit on the board. This will be DNR Exhibit number 41. I've labeled at the top "Pounds Per Hour of SO_2 Conversion Factor of Sulfur and Disulfur Oxides, Conversion Factor for the Percent Sulphur in the Coal," and I've put HOH which is supposed to stand for a moisture factor. That moisture factor, by the way, comes from where the samples are taken and the fact that the actual coal may be drier than it should be for proper analysis; is that correct?

A Yes, there's a moisture factor. When I look at this calculation, I'm really unsure what you're trying to do with the moisture in there. This is why I always prefer to put my calculations on pounds per million Btu; then I don't have to worry about the moisture barrier.

Q This is the way the state did its caluclations, isn't it?

A I don't have the state report in front of me so I can't testify really too well how they did it.

Q Well, how about looking at it? Page A4 of the state report -- that's the way they did it, right?

A Right. I'm looking at the moisture factor. Now, I just have to look through their entire computation. I've seen this, but it's been about a week back.

Q Find the moisture factor?

A Yes, I see the moisture factor.

Q Okay, now we can go on. The pounds per hour sulfur oxides that the state actually measured were 396,506, correct?

A The pounds coal in, yes. This is what they state that they're using for their calculation.

Q Yes. They measured that, didn't they?

A No, they didn't measure it.

Q No? How did they get that?

A How did they get that? They got that based upon my telephone conversation with Mr. Keltz.

Q Oh, that's right. You gave him the information and he had to calculate from that.

A For informational purposes only. Just so he has an idea how much coal was going through the plant, and I qualified these figures when I gave him the numbers.

Q Okay. So I've written down 396m under "Pounds Per Hour SO_2." That means what's going in. That's 396,000 pounds, right? Is that correct?

A Yes.

Q Okay. Now the factor under the conversion from sulfur to sulfur oxides that I told you about that was used before by the state is 1.9; isn't that correct?

A Yes, this is one factor some people use for a conversion of sulfur to sulfur dioxide.

Q And the moisture conversion factor for the state calculation was .75, was it not, about 25 percent water?

A Yes. If you take the coal going into the plant, approximately 25. In our case I think when we ran the test it was 25.5 percent.

Q This came out of area E, did it not, Dr. Grimm?

A Yes, it did.

Q And that's one of your low sulfur coal areas, isn't it?

A How do you mean low sulfur?

Q Well, lower than the other areas?

A Well, you look at both areas D and E and see the average sulfur contents are about the same.

Q D is lower than C, isn't it?

A I'd have to review the exhibit to be able to tell you with certainty that it is.

Q Well, .7 of a percent would be pretty low sulfur content, but you hope to get .7 of a percent sulfur content in your coal, don't you?

A Well, it would be nice to have .7 of a percent sulfur all of the time.

Q You get that some of the time, don't you?

A Yes, and we also see some higher; we also see some lower.

Q Okay. And in the actual tests that you conducted during these four days in February you had some .7 percent sulfur recorded, didn't you?

A I'd have to go back and take a look. The coal analysis data, when it's corrected back to this 25½ percent moisture content, the percent of sulfur ranged from 0.65 percent sulfur up to -- oh, there was one just a little over 1 percent, 1.02.

Q All right. So you did, in fact, have some sulfur at .7 of one percent or less, didn't you?

A Yes, there were some samples less than that. I see two of them in the group of the samples that are presented on my table B of my testimony.

Q All right, sir. Now, Dr. Grimm, showing you on DNR Exhibit number 41, the figures that are there now are the ones we have just discussed, and I will now make a calculation based upon the figures that you gave us before the recess. During the recess I was able to use my pocket calculator, and the figures come out like this. You see on the calculation what I've done, Dr. Grimm, is to take the 396,000 pounds of coal consumed, from which I've subtracted the 15 percent figure which you said in your opinion sometimes was a high reading, multiply it out the equation with the previous figures that you and I just discussed, came up then with the equation with the efficiency ratio that we would work out to be -- would you like to hazard a guess as to what that efficiency is for your sulfur oxide system on the figures that appear on DNR Exhibit 41?

A No, I won't hazard a guess.

Q Would you believe 47.6 percent?

A Possibly by your calculation. I can see several different things wrong with that calculation.

Q I'm sure you would like to tell us about those. I thought maybe we'd give you that opportunity now?

A Okay. Well, you said that you deducted 15 percent for a coal measurement.

Q You bet.

A Okay, this 396,000 pounds per hour -- this 396,000 pounds per hour is probably pretty close in the ball park for a full load operation of the plant. When I said 10 to 15 percent less, I meant starting with the base value of around 215 to 220 tons per hour. These are the values that I reported to Mr. Keltz. I had, oh, I think some readings -- one of them was fairly low; one was a little over 200 tons per hour, and I had, I think, three days, I think, that were between 215 and 220 tons per hour being fed in, and these are the figures that I said were 10 to 15 percent high, not the 396,000 pounds per hour.

Q Okay. Are you through?

A Well, this moisture factor bothers me. I would prefer not to do it with this method.

Q I think we can see why?

A Well, you have to go back and look at the basis for all his figures. You get the .007 percent sulfer. Okay, what's this on? Is this on the dry basis, partial moisture drying out of the pulverizer, or where?

Q Dr. Grimm, you were furnished with a copy of the entire state report, were you not?

A Well, I was asking the question. I don't know where this .007 comes from.

Q That figure, Dr. Grimm, is the one you and I just discussed during your examination?

A Oh, I discussed what I saw on my coal analysis figures, based upon what was in the pulverizer.

Q Yes. All that DNR Exhibit 41 shows is that if you have variances in the percent sulfur in your coal, or in your coal consumption, you will show variances in your percentage of efficiency on the operation of your systems. That's what it shows, doesn't it?

A We can look at our system and there isn't that much variance of the emission of sulfur dioxide. You go back to the monitoring data --

Q Excuse me, Dr. Grimm, you have a chance on redirect to explain whatever you want to explain, but you are supposed to answer my questions. Now, does DNR Exhibit number 41 show what I just said it showed, or doesn't it? Do you want me to repeat the question?

A I can say one thing, it shows what you want it to show.

Q Do you want me to repeat the question?

A No, you don't need to repeat the question.

Q Then, does it or doesn't it?

A This is one method that one set of individuals took to make the calculations. I happen to believe that the method that we made more accurately represents the case.

Q I'm sure you believe that. Now, tell me, if you will, Dr. Grimm, where can we find the figures which you have set forth in tables B and C to your statement of testimony in the Yapuncich data Exhibit number 278?

A Okay, B and C, Yapuncich data starting on page 13 through page 16 gives the results of a coal analysis data.

Q The figures are all different, aren't they?

A Yes, they are. There's a reason behind this, and the reason is --

Q Could you show us the reason?

A Yes, I'd like to explain my answer if I may. Now --

Q Well, you're answering somebody else's question. I want to know where in the Yapuncich data we find the figures that appear on table B or table C. Now, if those figures don't appear in the Yapuncich data, tell me that?

A The exact figures do not, but I have to use Yapuncich's figure to get back to the values in tables B and C.

Q You make corrections, is that right?

A Well, I wouldn't call them corrections, but we're used to thinking of coal on an "as received" basis and this means as it's received into the plant, and a great deal of testimony has been expressed on the coal analysis data and I wanted to present these partially dried samples as they came out of the pulverizer as withdrawn by plant personnel and as tested by commercial testing and engineering, I believe; the lab that ran the tests wanted to take them back and put them on a common basis, and this common basis is corrected to the 25.455 percent moisture content.

Q 25 percent moisture content? That means if you wanted to correct, you'd use a .75 figure, doesn't it?

A Yes, essentially .75.

Q Okay, sir. The other few questions I wanted to ask you, Dr. Grimm,refer first to your availability figures. You discussed those on page 3 of your statement of testimony. Can you tell us about percentages computed during the 1st and 23rd of February, 1976? What happened on the 24th?

A Okay. We're required to give data to the state once each month.

Q Now, Dr. Grimm, what happened on the 24th?

A I believe the plant was in operation. If I may, I'd like to explain how we got just to the 23rd.

Q Sure, and I'm going to ask you a question that'll permit you to do that, but if you'll answer my questions, we get along here much more expeditiously. So we understand now, the plant was in operation on the 24th?

A I think it was.

Q Okay. Why did you submit figures only between the 1st and the 23rd?

A As I started to explain a moment ago, we give the state data on a monthly basis. We're working up to giving them a complete report about the 15th of the month following the previous month's operation, and one of the pieces of data that the state wants to know about is availability of the scrubber system, air pollution control system. We submitted a report to them in late February and we had January availability data at that time and we had February availability up to a certain point, and this was up through the 23rd, and so that's why we gave them -- if we go through the entire month, that data, I think, is now being processed; I think we wouldn't see much change in the value that's quoted in this testimony.

Q Well, actually you submitted the data to the state on the 5th of March, 1976, didn't you?

A It could have been. I probably wrote the letter and I --

Q You probably did, but it has Dan Berube's name on it.

A Yes, and it also has CDG on the letter and, in fact, I wrote the letter.

Q Sure, and it was March 5, 1976, wasn't it?

A Yes, and this is -- we have a continuing program to present this data to the state and that's why we gave it to them.

Q Now you define availability as the hours your scrubber was available for operation divided by the total number of hours in the period in which you were making your calculation?

A That is correct.

Q All right. So if the scrubber were available and the plants were not operating at all for all the hours of the month of February, your availability would be 100 percent, wouldn't it?

A Yes.

Q But actually it wouldn't have been operating for one single hour during that month or, indeed, it would have been zero percent operation, wouldn't it?

A Well, all I'm defining here is availability; you're trying to define operation, and I'm using one index, availability.

Q Yes. I am correct in what I said a moment ago, am I not?

A It's one way of looking at it, yes. You have to define your index.

Q Sure. You are not trying to determine the availability of your scrubber during the periods of the time that the boiler is not operating or that the boiler is operating; isn't that true?

A Well, we take the total time period when the scrubber is available for operation, and whether the boiler is operating or not operating doesn't make any difference.

Q Okay. Now we want to talk a little bit, Dr. Grimm, about the remainder of your statement on best available control technology. Do you have any new views since you last testified in the Board of Health hearing on that subject?

A No, I do not. In my testimony here I have included a statement from the Federal Register and in effect I just reiterated prior testimony that's been given during the Board of Health hearings.

Q That's what I thought. Now, you won't deny, will you, Dr. Grimm, that there are flue gas desulfurization systems in operation in coal-fired electric generating stations in the United States that have a percentage efficiency in the removal of sulfur oxides substantially in excess of 75 percent? You don't deny that, do you?

A I have seen some reports to that effect, however, I think you have to qualify it by looking at the total system --

Q Sure.

A -- and this is going back to the best available technology. You have to look at a number of different factors. Designing a system specifically for Colstrip --

Q We know that, Dr. Grimm; it's in your statement several times.

A I know. It might be in my statement, but I'd like to explain when you ask me questions.

Q I think you've satisfactorily done so. Mr. Peterson can help you out on redirect examination again. Now, in your statement you refer to the conference you attended in New Orleans March 8th to 11th of this year, and a paper delivered by Dr. Gerald Isaacs of PEDCo?

A Yes, I have.

Q And Dr. Isaacs in that report entitled "The Status of Flue

Gas Desulfurization in the United States" described that there were operating systems with efficiencies in a range of 40 to over 90 percent, did he not?

A Yes, I saw -- he did and when I -- we received his paper; I heard what he said, and it's also in his paper.

Q Okay, that's what he said. Now, who's at the 40 percent range?

A I don't know, who is?

Q Montana Power Company, isn't it?

A Well, we'll quarrel with that figure.

Q Well, are you or are you not in that range in the Isaacs paper?

A He stated that in his paper and we quarreled with his use of that number. We have given him other data; he chose to ignore some of the data that was on the questionnaire that was presented to him, and he makes mention at this New Orleans symposium that he has no way of verifying the data, or he doesn't take the time to verify the data that comes in.

Q Now, Dr. Grimm, who is at the 90 percent rank?

A Who specifically?

Q Yes.

A I can't give you any specific plant right offhand.

Q You read the paper and you listened to the paper, and you still don't know any of the plants?

A Well, I had a whole listing of plants that they gave the percent removals for each one of the plants, but if the data is like what he's presented for us, I look at any of the figures that he has quite critically.

Q We know that you're critical, Dr. Grimm. You have to be when you're at 40 percent in his paper, but I want you to tell us, if you can, what do you remember of the 90 percent operating companies?

A Okay, what I remember most of the 90 percent stated figures is that these plants did not run closed loop.

Q What are their names?

A I would have to get a copy of his paper to be able to give the names offhand.

Q Do you recall his also saying in the same paper that the trend today in systems being built for flue gas desulfurization are to exceed substantially any design for new source performance standards? Do you remember him saying that?

A It could be true.

Q That would be a good idea, wouldn't it?

A Are you asking a question or making a statement?

Q Yes, I'm asking a question.

A The standards were set up to -- well, we get back into this question again --

Q Well, do you think it's a good idea or don't you?

A I think you have to design a system to meet the standards.

Q Not better than the standards?

A Well, you come back to our performance and we better the standards. The data that we presented for SO_2 removal is .44 pounds per million Btu and the standard is 1.2 pounds per million, so we're exceedingly better than the standard is.

Q Dr. Grimm, I don't know why you want to fight the questions. If you think that you're operating .44 and the standard is 1.2, then don't you think it's a good idea to operate better than the standards?

A We are operating better than the standards.

Q Good. Is it a good idea?

A It's a good idea to operate within the standards.

Q Better than?

A Yes, in this case we are operating better than.

Q Well, what if you were not? Then would it not be a good idea anymore?

A Well, we don't intend to operate in excess of the standards; it's a bad idea.

Q Of course you don't, but if you were, would it not be a good idea?

A If we were in excess? I just stated that it is not a good idea, or we wouldn't design a system to operate in excess of the standards.

Q It is not a good idea?

A That is correct.

Q All right. Now, see if you can listen to this question, the answer to which is yes or no, and come up with a yes or no answer. In your opinion, do you think it is a good idea to design a system to operate better than existing standards?

A Yes, and we go back to our --

Q Thank you.

A -- plant and we have designed it to operate better than the existing standard.

Q And you think that's a good idea?

A Yes.

Q Good.

A You have to have assurance that you're going to meet the standard.

Q But not better?

A Well, as I stated again --

Q Oh, never mind, Dr. Grimm. Let me ask you about another aspect of the Isaacs' paper. He said, did he not, and wrote that the trend of all new flue gas desulfurization systems being installed in generating stations in this country is to separate the particulate and gas use removal collection systems, right?

A I believe he made some statements to that effect.

Q Okay. Now, let's go to the contact that PEDCo has had with the Montana Power Company. First contact was August 26, 1974 with Mr. Tom Smith. Who's Tom Smith?

A He works in our environmental department.

Q Okay. And the contact was continued on a monthly basis from August, 1974 until today with people being contacted including: Daniel Berube, Robert Labrie, Carl Anderson, but not you. You don't deny that, do you?

A I don't remember talking with a group, so I can only speak for myself.

Q Okay. Now, did you know that in the contacts on a monthly basis which have been maintained between PEDCo and the people that I have named for the Montana Power Company, at no time did anyone from the Montana Power Company suggest that a different efficiency of operation in a flue gas desulfurization system should be used for the Montana Power Company than originally projected in August of 1974? Did you know that?

A I'm not aware of that fact, but I am aware that the original questionnaire that was transmitted to PEDCo had a substantially higher SO_2 removal figure. They asked what the outlet SO_2 would be and they also asked what the inlet SO_2 would be, and --

Q Do you know Mr. Balko of CEA?

A Yes, I do.

Q Did you know that he also supplied information to PEDCo for their reports?

A No.

Q Okay. Now, as a matter of fact, Mr. Devitt of the PEDCo environmental specialists presented his testimony here and attached to it Exhibit number 140. As I understand your testimony, sir, you do not disagree that the information which is in Exhibit number 140 is useful information; isn't that right?

A That's correct. It is useful information.

Q But it's only as useful as the accuracy as the informants who are, in fact, the utility companies and their contractors; isn't that true?

A Well, these are two of the organizations that have been reporting to PEDCo, and --

Q Right. And the criticism of the PEDCo --

A Yes. And I'd like to state that we try to answer the questions that PEDCo has to the best of our ability, but we don't always know what information they're after, and possibly by designing their inquiries a little bit better they could get better insight into the systems and provide more realistic, more valuable engineering data to the industry.

Q Criticism of the PEDCo report given at the meeting in New Orleans was voiced by a well known, colorful representative of Southern California Edison, right?

A He could have been. I think I know of the individual that you're speaking of.

Q Yes. And what he said was, "This is GIGO," right?

A This is who?

Q Gigo. G-I-G-O. Garbage in, garbage out.

A Yes, I remember a statement to that effect.

Q Right. And the garbage in means that if you can't trust the utility companies and the contractors with the information you receive, then you can't trust the responses by conclusion either; isn't that true?

A Would you let me think for a moment? Can you repeat the very last part of your question?

A Isn't that true?

A No, no. One statement back, please.

Q If you can't trust the utilities with the information they supply, then you can't trust the conclusions which you will draw from that information?

A Well, I think you -- in asking for information you have to -- well, you should verify it. If you do get information from people, you should verify it by an independent means, and you should acquaint the personnel that you're asking a question of sufficiently well so that he knows how the information is being used. You can ask a specific question and you might just touch on one facet; there might be more to the big picture, and as far as I know, PEDCo hasn't sat down with us for a day or two days to go over our system. We'd be happy to do this with them and we can explain the removal efficiencies and the other constraints that we live under with our system.

Q Did you volunteer to do that, Dr. Grimm, when Mr. Devitt, the Vice-President of PEDCo in charge of this aspect of their operations was here sitting in this very room for three days this month?

A No, I didn't volunteer the information, or I didn't volunteer that. I think it's something that these organizations should ask the utilities. He didn't ask the question.

Q Okay. I now want to return to the Cholla Plant because the Board of Natural Resources has not had the pleasure of your discussion of the Cholla Plant other than in the statement which you provided, which on page 6, I put to you, sir, is in fact, is it not, misleading?

A Which is misleading? I'm not trying to mislead anybody.

Q Well, good. Then turn to pages 38 and 39 of Exhibit number 140, which I see you have before you --

MR. SHENKER: Do you want to break now, Carl?

HEARINGS EXAMINER: Yes, we will recess until 1:30.

(RECESS AT 12:00 P.M.)

William G. Sheridan, Jr. was also present as counsel for the Department of Natural Resources and Conservation.

Following the luncheon recess, the hearing reconvened at 1:33 P.M. on March 23, 1976.

HEARINGS EXAMINER: Let's proceed.

CONTINUATION OF EXAMINATION OF DR. CARLTON D. GRIMM

Rebuttal, Cross, by Department of Natural Resources and Conservation

By Mr. Shenker (continuing):

Q Dr. Grimm, before we broke for lunch, we were looking at pages 38 and 39 of the Exhibit number 140 of the DNR. Now, that discusses, does it not, availability for the same cholla unit which you describe in your statement of testimony in rebuttal at page 6?

A Yes, it does.

Q And what you say in your statement is that it took two years with availabilities in the 50 to 60 percent range to reach a recently claimed performance of 90 percent removal and 100 percent availability recently, right?

A Yes.

Q Okay. Now, before you on pages 38 and 39 is a listing from January of 1974 through December of 1975 of the availability and percentages for the cholla unit for each of those two modules A and B, right?

A Yes.

Q Would you tell us, sir, if there is any month for module number A in which their availability was less than 40 percent?

A No, I do not see one less than 40 percent.

Q How about module B?

A Module B has one reading of 40 percent in May, 1975.

Q Okay. Now, how many months over that period of 24 months do you find module A between 40 and 50 percent availability?

A I see one month.

Q And how many months between 50 and 60 percent availability?

A I don't have any months for that.

Q How many between 60 and 70?

A I have a month. This is just module A you're talking about.

Q Yes, we're looking at module A first. How many between 70 and 80?

A I don't see any.

Q Okay. Then between 40 and 80 percent availability, we have two out of the 24 months represented. You would conclude, would you not, that -- excuse me, I said 24 months; it should be only 23 months because March of 1975 is not recorded; isn't that correct?

A Right. There is no reading for March, '75 for either module A or B.

Q Yes, so it's 23 months, not 24 months. So if two of the 23 months are between 40 and 80 percent, then you would conclude, would you not, that 21 of the 23 months are between 80 and 100 percent availability, right?

A Yes.

Q Okay. Now, it is also true, is it not, that over that period of two years, in February and March of 1974, two of the first three months, your availability in module A was at 100 percent, was it not?

A Yes, there are a couple months where it's at that point, yes.

Q And then that recurs again in June of 1974, November of 1974, December of 1974, June of 1975, November of 1975, and December of 1975, right?

A Yes.

Q Now, if we turn our attention to module B, do we have any months in which the module operated at an availability of between 40 and 50 percent, other than the one at 40 percent?

A I see the one that you mentioned.

Q All right. And how many months in operation for module B at availability between 50 and 60 percent?

A I see one month.

Q You should see two?

A April of 1974 --

Q And October of '75?

A Okay, and October of '75.

Q Good. How many months between 60 and 70?

A March, 1974, October, '74, April '75. You said between 70 and 80?

Q No, between 60 and 70. Okay, any between 70 and 80?

A November, '75 at 80 percent -- that's the only one I see.

Q That's seven months in which there were operations at 80 percent or below. You'd have to conclude, therefore, that there were 16 months in which the operation was availability more than 80 percent, right?

A Yes.

Q And we find with module B that the first 100 percent availability was in June of 1974, and that recurs in December of '74, June of '75, August of '75 and December of '75, right?

A Yes.

Q And is that the data upon which you relied to determine that the availabilities were 50 to 60 percent for two years before they became 100 percent recently?

A Yes. You can look at this data and there are values between

50 and 60 percent; let's say between 40 and 70 percent, there's a number of values.

Q Well, tell me, Dr. Grimm, what's the average availability?

A And they also have a less stringent definition than we do on availability of the unit.

Q What's the average availability?

A I'd have to carry out the calculation; I don't know right now.

Q Well, the important fact that I wanted our record to show is that the figures that you and I have just discussed on pages 38 and 39 of DNR Exhibit number 140 are the basis for your statement of taking over two years with availabilities in the 50 to 60 percent range, and that is true, isn't it?

A Yes, it is.

Q Okay.

A You can look at the data and it supports it.

Q Well, the record will determine by the finders of fact whether it supports it or not, sir. Now, in your statement also you refer to a report from a James L. Glenn, which I believe you have marked as Exhibit number 277 for this proceeding, and you refer to something at page 21 of Exhibit number 277. My copy doesn't have page 21 numbered on it, but I assume it's the one called "Fluoride in the Air"; is that right?

A Yes.

Q Okay. Now is it that same Exhibit number 277, sir, which you believe is the basis for the opinion which you stated that fluoride concentrations exceeding Montana standards are not caused by the power plant?

A Yes, it's this exhibit.

Q Can you show me where on page 21 Mr. Glenn mentions the word power or the phrase power plant?

A He doesn't mention the word power plant, however, he does state in his statement that I've quoted in my testimony that, "In the past there has been a great deal of controversy over who might be responsible for the high concentrations of fluoride in Yellowstone Valley. The data from the Laurel area makes it painfully apparent that the fluoride levels are directly attributable to refinery operations in both Billings and Laurel areas."

Q Now, Dr. Grimm, even though Mr. Berube is leaving the room, we'll report to him that you're doing your job, sir. You don't have to repeat your speech for the third time. Is there any place in Exhibit 277 where Mr. Glenn said that the power plants are not causing fluorides to be exceeded?

A I don't remember such a statement, but I do see what's on page 21, where he points at the cause of the fluorides.

Q And you know, do you not, Dr. Grimm, that other studies have shown that 50 percent of the fluorides come from the refineries taken as a whole, and 50 percent of the fluorides come from the power plant?

A No, I'm not aware that 50 percent comes from the power plant.

Q You've never heard of anybody so testify; you've never seen any studies so conclude? Is that your testimony?

A Yes, I haven't seen any of those figures in that breakdown.

Q All right, sir.

MR. SHENKER: I have nothing further. I do wish to offer for illustrative purposes the DNR Exhibits 39, 40 and 41. No, excuse me, 40, 41 and --

HEARINGS EXAMINER: I have 40; I don't have anything past 40 noted.

MR. SHENKER: This one is marked 40, and the following one would be marked 40-A.

HEARINGS EXAMINER: They're both backboard calculations, aren't they?

MR. SHENKER: Yes. My calculations with Dr. Grimm refer to DNR 40-A. His calculations or computations and DNR 41 are the second set of computations I did with Dr. Grimm.

HEARINGS EXAMINER: Are there any objections, Mr. Peterson?

MR. PETERSON: No objections.

HEARINGS EXAMINER: Very well. DNR Exhibits number 40, 40-A and 41 are admitted and do you have any objections to the --

MR. SHENKER: No objections to any of the exhibits.

HEARINGS EXAMINER: All right. Applicants Exhibits 277, 278 and 279 are admitted. Mr. Peterson, redirect.

Rebuttal, Redirect, by Applicants

By Mr. Peterson:

Q Dr. Grimm, first of all with regard to the operation of Colstrip unit number 1, there was some discussion by you relative to slag buildup in the boiler. Was that slag buildup -- did it affect the efficiency of operation?

A No, it did not.

Q What effect, if any, did it have?

A The only effect it would have is on the removal of bottom ash or slag that accumulates in the boiler and removing it through the bottom ash system pump.

Q Was there any buildup, to your knowledge, of an 85 foot cone?

A No, there was not.

Q Was the boiler recently shut down because of any slag buildup?

A No, the boiler was shut down, as I stated before, because of the circulating water pump. They got in to look at the pump and replaced that.

Q Now, with regard to your computations that you have made as to the sulfur removal from Colstrip 1 based upon the recent tests, what would be the percentage of removal if we used the coal computations shown in Exhibit 278 without making any reduction in accordance with your suggestion?

A Can you restate the question, please?

Q What would be the effect on the percentage of removal as you have computed it if we used the higher coal consumption figures which are shown in Exhibit 278?

A The percent removal for sulfur removal would be higher.

Q Do you know how much higher?

A I haven't carried out the calculation; I would say they were around 10 percent higher, between 5 and 10 percent more.

Q And while we're on the question of the percentage of removal, you did review, I believe you testified, the state's calculations on efficiency collections made by them based upon the same tests; is that right?

A Yes, I did.

Q And in their efficiency of removals they had a figure quoted which has been now put on the board in DNR Exhibit 41 of 396 million pounds per hour of coal consumption. Mr. Shenker then deducted from that figure 15 percent on DNR Exhibit 41. Why should --

MR. SHENKER: Thousand.

Q Yes, thousand tons. Why should that 15 percent not be deducted?

A Well, this 396,000 pounds represented an already corrected figure. People from the air quality bureau corrected downward from a higher figure. They had probably something like 420 to 440,000 pounds, so they made a correction to that figure and the 396,000 was the final result that they used.

Q Now, you also made the statement on cross-examination that the use of the .75 for moisture correction bothered you, and there was also included on DNR Exhibit 41 a figure of .007 as a percentage of sulfur. Is that the figure that the state used in reporting their efficiencies?

A No, it is not. The state used an oven dried figure for the sulfur content.

Q And that would have been .009?

A That is correct.

Q And then the state applied the .75 moisture correction factor to the .009, did they not?

A That is right.

Q And so if you apply the .75 correction factor again to the .007, it is, in your opinion, not proper?

A That is correct. It is not proper. It would be applying the same correction factor twice.

Q In the state's computations, they came up with SO_2 efficiency of 65 percent?

A I believe so, yes.

Q Do you know whether or not that was for the total plant sulfur removal or just for the scrubber efficiency?

A That was primarily just the scrubber efficiency. They did not have the total plant efficiency.

Q And your efficiency of 75 percent is based upon the total plant removal of the sulfur content?

A My figure is on the total plant removal based upon the incoming coal and its qualities and the amount of sulfur dioxide detected in the stack.

Q You consider that to be a valid and recognized method to compute sulfur removal?

A Yes, I do.

Q Why?

A Because using the available information that you have, you can make a relatively easy calculation and obtain the efficiency of removal across the entire system.

Q When you make the comment in your statement that the PEDCo definition of availability is far less stringent than your definition, in what respects is it far less stringent?

A They don't penalize the availability figure for when the boiler is out of operation.

Q Can you give us an example of that?

A It's easier for me to state what our figure is based upon. We take the total number of hours in the time period, the recording period, and we also take the number of hours that the scrubber was in operation and obtain our availability from that. PEDCo, when the boiler is down and maintenance is being done on the scrubber, there is no penalty against the scrubber for that time period.

Q At the meeting in New Orleans when PEDCo was giving their reports, were there other utilities that complained to PEDCo other than Southern Cal. Edison representatives?

A Yes, there were. I remember -- I'm trying to remember who the people were that asked questions. I just don't have an answer for who the other ones would be.

Q And with regard to the Cholla Plant, is Cholla now planning to put module B into operation as a flue gas desulfurization module?

A I haven't heard of any plans that they have there.

Q Are they adding equipment on to the Cholla Plant?

A Well, they're planning to build two more units at Cholla, Cholla 2 and Cholla 3, but they're not doing anything more to Cholla 1 that I know of.

Q Does Cholla 2 and Cholla 3 -- will they adopt these same systems for removal as is now in Cholla 1?

A Cholla 2, as I understand, will adopt a similar system that is in Cholla 1, however, Cholla 3 will not have any air pollution control system.

Q Why is that?

A Well, both systems will share a common chimney. Each system will have a flue in this chimney so there's two flues per stack, for this one stack, and they're going to rely upon mixing of the flue gas at the exit of the stack to meet the ambient conditions. It's my understanding that this plant has passed the required state agency; it has their approval.

Q What, then, would be the combined removal?

A The combined removal? Whatever removal that they're getting out of Cholla 1, zero removal -- excuse me, whatever removal that they hope to get out of Cholla 2, zero SO_2 removal for Cholla 3, add those two and divide them by two, so it's essentially one half of what you see on Cholla 1.

Q And that seems to be, then, the trend that Cholla is going to follow in their flue gas desulfurization program?

A Yes.

MR. PETERSON: I have nothing else.

Rebuttal, Re-cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q Well, that's very interesting, Dr. Grimm. From one process for one utility, you find a trend, I take it?

A I think the question was that is that the trend for Cholla units, and it is.

Q I see. And you've done again what you did so often during the Board of Health Hearings; you have added zero to 90 and divided by two and gotten 45 to determine that's the efficiency of Cholla, right?

A Cholla 2 and 3, yes.

Q Yes. Of course what that tells us is if you have one system that doesn't operate and another system that does operate, the average of two systems is something less than the one that does operate, right?

A Well, that's one way of putting it, but I think it would be best to remember it in the context of the Cholla 2 and Cholla 3 where one has a system on it for removing SO_2; the other one does not.

Q Okay. If we wanted to know on the basis of Cholla operations how well we could operate, we wouldn't want to look at the system which didn't operate at all, would we?

A Oh, I think you'd like to take a look and see what sulfur values are in the coal and how much SO_2 is coming out. This is baseline data.

Q Okay. Mr. Peterson asked you whether the slag in your boiler at Colstrip 1 had any effect upon the efficiency of your operation. Now, let's assume, Dr. Grimm, that you didn't bring the unit down, that is to say out of operation, and let's assume further that the slag did build up to the point that you had a cone 85 feet tall and 40 feet wide. Would that affect the efficiency of the operation of your boiler?

A It would probably affect the efficiency of operating the unit. I don't know whether we might have to come down on load. The efficiency of converting the energy in coal to electrical energy, I doubt that that efficiency would be affected. You present a hypothetical case and --

Q Yes.

A -- I have to make some assumptions. I'm afraid I reject most of the assumptions that you make.

Q Well, that's not new. Now, tell me, Dr. Grimm, what if it were 125 feet instead of 85 feet; would that affect the operations any?

A Oh, it probably would.

Q How tall is your boiler?

A Well, the top of the boiler, the very top of the steel structure, the penthouse, is around 220 feet above the ground. What the exact dimensions of the boiler cavity are, I just don't have that information at my fingertips.

Q I see. You don't have with you the exact dimensions of the large rock that was inside the boiler either, I take it?

A I talked with the plant superintendent and --

Q During the noon hour?

A No.

Q What does he say now?

A What does he say now?

Q Yes.

A Well, when I talked to him this morning he said that the buildup is up to about the observation point, or observation ports on the mezzanine level; this is about 10 or 12 feet above the plant floor. The thickness of this deposit isn't uniform; possibly it could be 10 feet at its thickest, but it tapers off to the sides.

Q Do you think it's around 120 square feet?

A Oh, I'd have to scale off the dimensions; I'd have to look at the site cavity and from what I gather from him they're still able to pull slag and this just was a good time to get into the unit and clean out that clinker. It hasn't really --

Q Well, this large rock, 12 feet high and 12 feet wide in some places, how much did it weigh?

A Oh, I really don't know; I could make some guesses. I'd say someplace between 5 and 20 tons.

Q I don't suppose you took a couple of maintenance men in there and had them push the rock out?

A No, the maintenance men would break the rock up so that they could move it to the bottom ash system. It has to be broken up into smaller pieces.

Q Now, with respect to the amount of coal that was consumed during this last test of yours, the fact of the matter is, is it not, that the state measured tons per hour of coal consumption and calculated tons per hour?

A The state did not measure tons per hour. We measured the tons per hour for them.

Q And they took you on your word for those measurements?

A Right, and this is why I keep coming back to conversations with the air quality bureau. I gave them the information what our calculations were and said they're for information only, that we believe that these rates are too high. There is difficulty in making accurate measurements at this time of the coal quantity going through the boiler.

Q Yes. Now, the fact of the matter is that the measurement that you gave them was 204.55 tons per hour, which their calculations on a theoretical basis showed would have been 198.2 tons per hour, and it is the latter figure which is represented by 396,000 pounds, right?

A Yes, that's just one figure. There were coal figures taken for the four days and I saw some assumption figures as high as 220 tons per hour. I think three of them were that high; one of them was around 205 tons.

Q 204.5, 216.7, 217.3 and 223.4, those were the figures?

A That sounds correct.

Q Yes. And the state's view was that only the figure measured at 204.5 was in the ball park of what it should have been based upon calculations, right?

A Well, it's getting close to the ball park, yes.

Q Yes. And their calculation on that figure was 198.2, which is the 396,000 pound figure that you see on DNR Exhibit number 41, isn't it?

A It could be, yes.

Q Yes. Okay. Now, so much for that figure. Then you talked about a moisture correction that had to be made. Now, you, of course, made moisture correction yourself, didn't you, when you went from the Yapuncich data to your own calculations?

A Yes. I went from the oven dried value to the "as received" to bring it back to similar samples that would have been taken over the belt or out of the silos.

Q And the moisture correction figure you used is .75, the same figure that's on there?

A Yes, essentially.

Q Okay. Then it is also the case, is it not, that on table B appended to your testimony you showed the actual sulfur content of the coal during the four days of that test to the extent that you analyzed coal with respect to that test, right?

A Yes.

Q Good. And the reason that you think this is a pretty hunky-dory test is that you used information that was available for making easy calculations, right?

A It isn't just information available to make easy -- to make the calculations easy. It's a way of understanding what's happening. We didn't -- you can take the percent ash and the percent sulfur on the oven dried basis as they come from CT and E and the Btu value and you get the same answers.

Q What's the CT and E?

A Excuse me. These are a commercial testing and engineering firm. It's a coal testing firm.

Q Okay. Oh, by the way, the terms of easy calculations -- if one wanted to measure the concentration at the inlet to your SO_2 system that wouldn't be physically easy, would it? I mean it's kind of difficult to get in there?

A Well, there are three ducts going to the scrubber --

Q Right.

A -- and there are places to sample at that point. There are in effect two sets of sampling points that could be used. It's somewhat uncomfortable in the winter months to sample at those points.

Q Like in February?

A Right. Like in February, however, the tests that we had run were to comply with the standards and these are the emission standards, and that's the data that we obtained.

Q Do you have the same kind of sampling equipment which the state has?

A When you say us --

Q Montana Power Company, Western Energy Company or any of those?

A Well, the people that --

Q Yapuncich?

A -- sampled are a commercial laboratory out of Billings, Yapuncich, Sanderson and Brown, and they have similar equipment to the state, I imagine even the same trade name. There is one firm that supplies equipment. In fact these people were recommended to us by the state.

Q And your nitrous oxides readings, as I recall it, between you and the state were off by a factor of around 2 to 1, weren't they?

A I don't believe it was that high. There was some difference in readings between the two.

Q Yours were the lower by a factor of approximately 50 to 60 percent of what the state's readings were; isn't that right?

A I know ours were lower than what the state has.

Q By a substantial amount?

A Well, you look at the value anyway and it's a fairly small amount for nitrous oxides. It's a grab-sample method and --

Q Kind of a rough way of calculating?

A Well, the samples were taken in accordance to EPA methods and reported according to the way the EPA wants the calculations carried out and this is detailed in Exhibit 278.

Q I don't think you answered my question. The amount that you were lower than the state is a substantial amount; it's not a 1 or 2 percent difference, is it?

A Well, I think we could probably sit here most of the afternoon and disagree on what a substantial amount is.

Q No, we won't. Is it 1 or 2 percent different?

A It's not 1 or 2. There is a difference between the two and I don't have the state's figures in front of me so I can't give you an exact definition on how many percent.

Q You have no present recollection of the approximate disparity between the Yapuncich figures and and the state figures on nitrous oxide; is that your testimony?

A I know what Mr. Yapuncich has reported. Now, I have an idea what the ball park figure for the state is, but I don't have the report in front of me so --

Q Good. Tell me the ball park figure by a percentage comparison with Yapuncich?

A Well, I could say there's 20 percent, 30 percent; I don't know.

Q It's not less than that, is it?

A It could be in that neighborhood.

Q And it could be higher?

A I just prefer to stand on the report that I have, Mr. Yapuncich's number.

MR. SHENKER: Nothing further.

Rebuttal, Re-redirect, by Applicants

By Mr. Peterson:

Q Dr. Grimm, with regard to the slag that was found in the boiler in unit 1, is there any program to correct the slag buildup?

A Yes.

Q What will be done?

A I talked to the plant superintendent and he found one of the buckets, or one of the feed nozzles was turned downwards in the boiler. This caused the slagging problem. They could not observe this through the observation port when the boiler was not in operation, so they could only suspect this might have been the problem. Well, they found the reason for the slagging and they're correcting it and the slagging should be minimized from now on.

MR. PETERSON: That's all I have.

Rebuttal, Re-re-cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q Are you going to have a solution to the next problem that comes up, too, after it's come up?

A I expect so. This is good engineering work. You have a problem, tackle it, find a solution, and you shape the solution and go on to better things.

Q And thankfully for good engineers, there's always new problems to tackle, right?

A Well, that's --

MR. PETERSON: Objection, Your Honor.

HEARINGS EXAMINER: Sustained.

MR. SHENKER: Are you afraid we're going to talk about how good lawyers have new problems to tackle? Nothing further.

HEARINGS EXAMINER: Very well, you're excused.

(WITNESS EXCUSED)

HEARINGS EXAMINER: Call your next witness.

MR. PETERSON: Mr. Martin.

CHADWICK L. MARTIN, called as a rebuttal witness by the Applicants, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

MR. PETERSON: At this time, Mr. Davis, we present testimony of Chadwick L. Martin and I'll move into evidence Exhibits 280, 281 and 282.

HEARINGS EXAMINER: Very well.

(THE WRITTEN DIRECT TESTIMONY OF MR. CHADWICK L. MARTIN WAS DIRECTED TO BE INSERTED AT THIS POINT.)

TESTIMONY OF

CHADWICK L. MARTIN

My name is Chadwick L. Martin of Helena, Montana. I am an ecologist with the Ecological Consulting Service. I graduated from Montana State University with a B.S. (1972) in Wildlife Management and hold a Masters of Science (1975) in Aquatic Ecology. I have engaged in liminclogical studies on Yellowtail Reservoir (1969) and Canyon Ferry Reservoir (1971-1972). My testimony in this proceeding has been prepared in collaboration with Ray Austin who holds a Bachelor of Science (1970) and a Masters of Science (1973) in Wildlife Management from the Montana State University and has had work experience with wildlife research laboratory, Montana State University for Fish and Game Department (1968-1969) and worked for the Fisheries Division of the Montana Department of Fish and Game (1968-1970). Mr. Austin has been employed as an ecologist for Ecological Resources since February 25, 1973.

Ecological Consulting Service appreciates the Montana Fish and Game Department's efforts to maximize all wildlife habitat potential as dictated by their statutory responsibilities. In reviewing the testimony of the Fish and Game Department it is clear that the maximum withdrawal of water from the Yellowstone for Units 3 and 4 do not pose any threat to fish and wildlife.

Ecological Consulting Service analysis of the requested 15,700 gallon per minute withdrawal from the Yellowstone River is that it will not have any detectable effect on fish, game, fur-bearing animals, and non-game wildlife concentrations or production, particularly since there will be no water withdrawal if the river flow rate becomes less than 1,500 cfs.

Figures 1 and 2 give the Yellowstone River bottom cross-sections corresponding to the water levels for 8000, 4000, and 1500 cfs flow rates 3 miles west of Forsyth and at the Fort Keough Bridge in Miles City. The proposed 15,700 gallon per minute (35 cfs) withdrawal would lower the water levels for each flow rate by less than 1 inch or in Figures 1 and 2 by less than the width of the line (by less than 1 mm). Applicants Exhibit #280, gives references and calculations dealing with water level decreases.

The natural daily river flow rate variation is far greater than 35 cfs. Applicant's Exhibit #281 gives the daily flow rate variation during the low water level months of December 1974, January 1975, and February 1975. The daily average cfs changes were 867, 552, and 234 respectively. A 35 cfs change would not significantly add to the daily variation of water level. Further, aquatic organisms living near the shore are adapted to either move with water level fluctuations (insects such as mayflies) or withstand submersion and exposure (algae such as diatoms).

In essence, the Montana Fish and Game Commission application for reservation of the flows of the Yellowstone River requests the authority to stop all water users 30% of the time during any given month.

Referring to Fish and Game Commission Application for Reservation of Flow-Yellowstone River, page 7, Reach 2 flow needs; a yearly average of 9271 cfs has been requested.

Irrigation accounts for the major water withdrawal from the Yellowstone River. From 1966 through 1971 the yearly average irrigation water withdrawal was 427,694 acre feet (Applicant's Exhibit #282). A 5-month irrigation season involves a 1418 cfs withdrawal. A withdrawal of 35 cfs, or 15,700 gallons per minute, is 2% of 1418 cfs and 4/100% of 9271 cfs. A 35 cfs withdrawal poses no threat to either fish and wildlife or agriculture.

Water Diverted for Irrigation for Four Bureau of Reclamation Projects *

Year	Acre Feet Diverted
1966	463,663
1967	392,069
1968	430,044
1969	464,365
1970	404,362
1971	411,661
Total	2,566,164
Average Annual Diversion	427,694

* U. S. Department of the Interior, Bureau of Reclamation, "Crop Production Summary, Federal Reclamation Projects - Region 6"; 1966 - 1971. The four projects are Buffalo Rapids, Intake, Savage Unit, and Lower Yellowstone.

Applicants Ex. 282

Yellowstone River water level decreases with 35 cfs withdrawal *

Station	Fraction Withdrawn	Average Depth in Feet	Water Level Reduction in Inches
Forsyth	35 cfs/4000 cfs	3.0	.31
	35 cfs/1500 cfs	2.0	.56
Miles City	35 cfs/4000 cfs	4.4	.47
	35 cfs/1500 cfs	2.0	.56

* The river profiles were taken from data contained in correspondence from the Regional Director, Bureau of Reclamation, Billings, Montana to Ecological Consulting Service, dated November 1, 1971 entitled "Yellowstone River Pumping Site Cross Sections - Reconnaissance Investigation of Missouri-Yellowstone Tributaries, Montana".

Daily Changes in Flow Rate of the Yellowstone River at Miles City for December, 1974; January, 1975; and February, 1975 (cfs) *

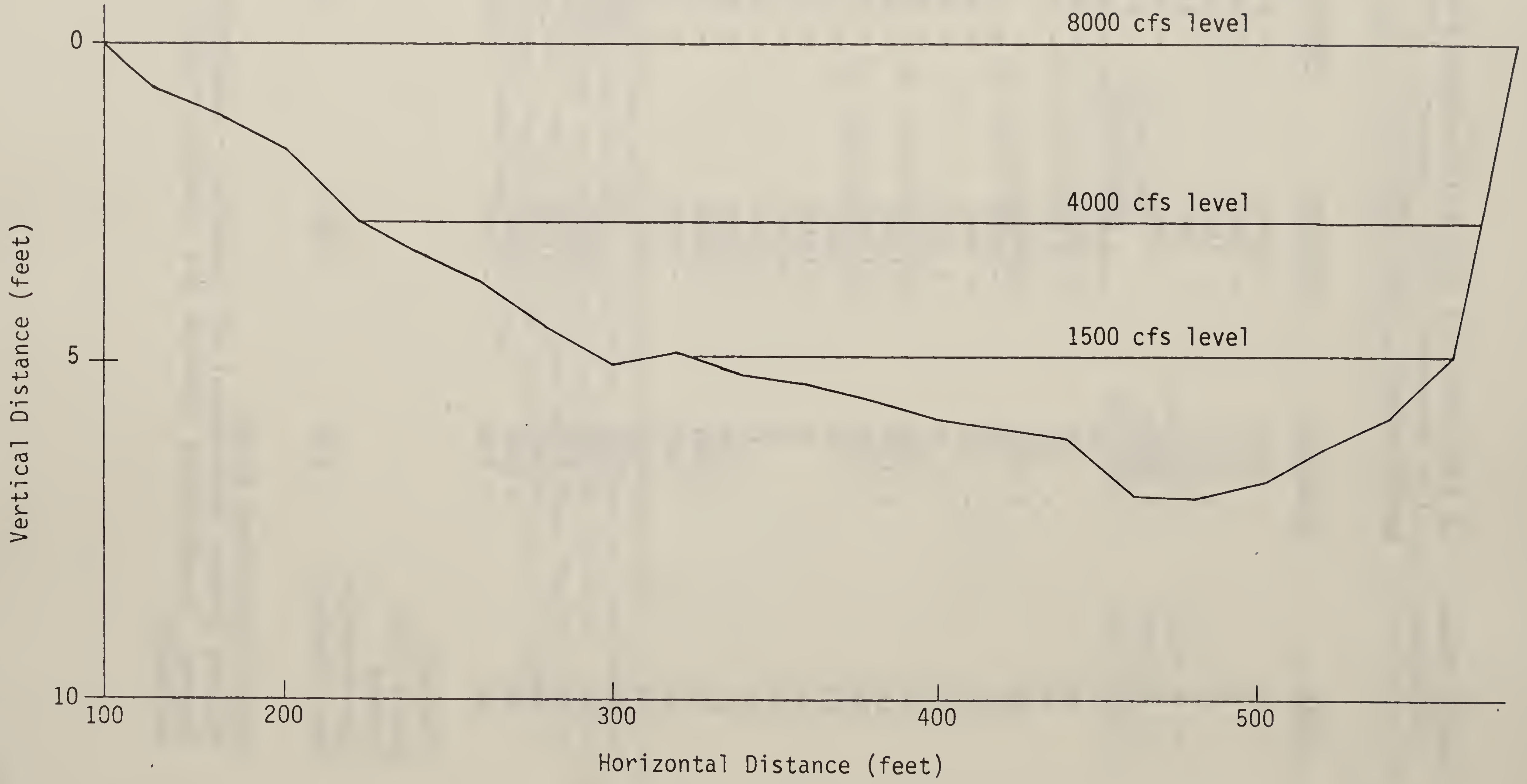
Day	December	January	February
1	- 400	- 100	- 200
2	- 200	- 100	+ 500
3	+ 100	- 100	+ 300
4	+1100	- 100	- 400
5	+ 600	- 100	- 700
6	+ 100	0	+ 500
7	0	- 100	+ 500
8	0	- 200	+ 300
9	+ 10	- 200	- 300
10	- 250	-2000	0
11	- 70	-1400	+ 500
12	- 90	+ 400	+ 900
13	0	+ 500	- 200
14	- 100	+1500	+ 800
15	- 100	+1500	+ 800
16	- 100	+1000	+ 800
17	0	+1000	+ 200
18	0	+1500	- 200
19	0	+4500	- 700
20	0	-1300	- 200
21	- 100	-1100	+ 800
22	- 200	-1300	- 500
23	- 200	- 600	- 500
24	- 400	- 200	+ 500
25	- 400	0	+2000
26	- 500	-2000	+ 500
27	- 300	-1500	-1100
28	+ 600	-1000	----
29	+ 800	- 500	----
30	+ 300	- 200	----
Average Daily Flow Change Disregarding Sign Change	234	867	552

*Data calculated from:
United States Department of Interior - Geological Survey, Unpublished records for station number 06309000.

Applicants Ex. 281

FIGURE 1

YELLOWSTONE RIVER CROSS SECTION
FORSYTH[1]



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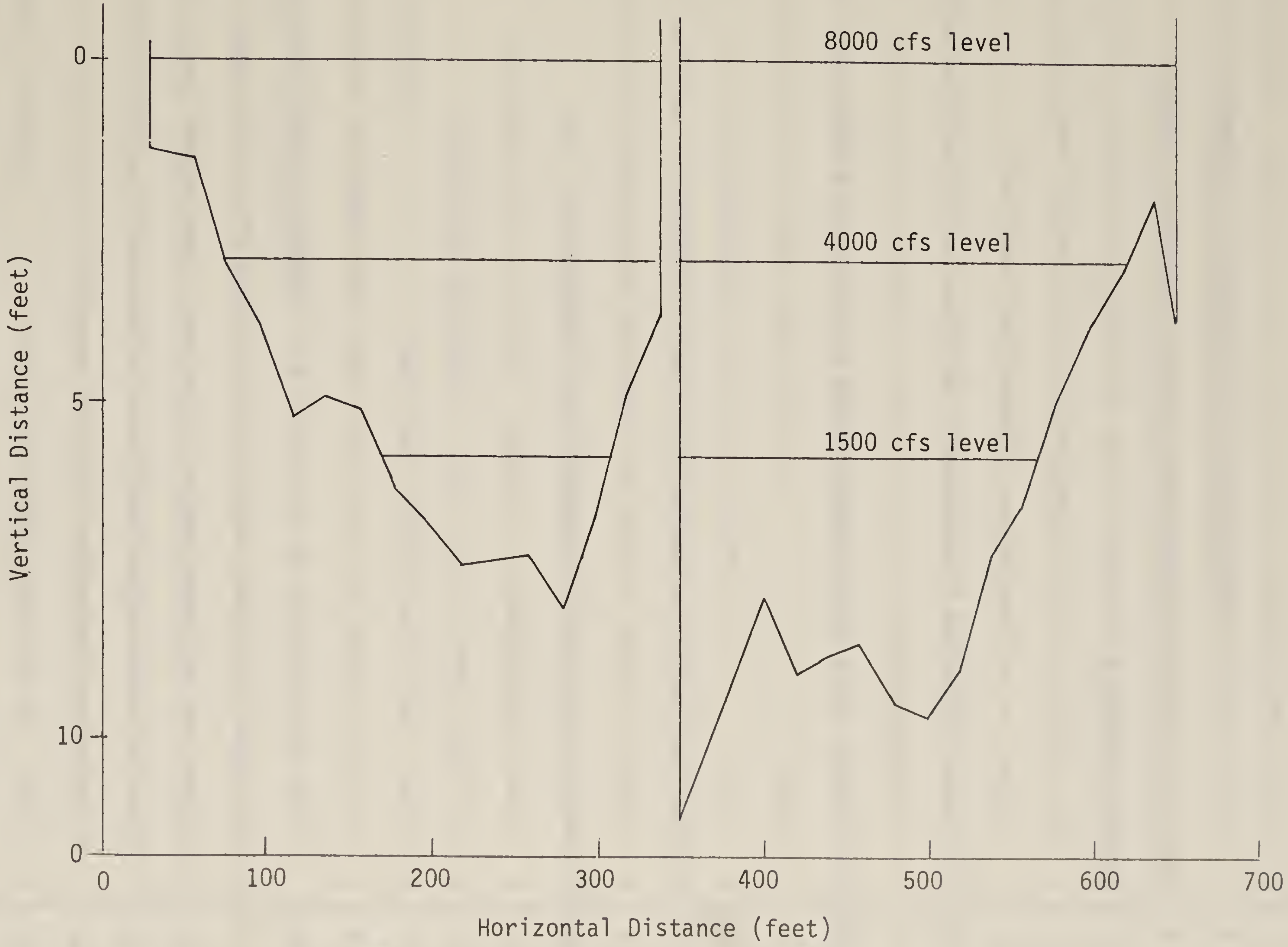
[1] See Exhibit 1 for reference.

FIGURE 2

YELLOWSTONE RIVER CROSS SECTION
FORT KEOUGH BRIDGE, MILES CITY[1]



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[1] See Exhibit 1 for reference.

HEARINGS EXAMINER: Mr. Graybill.

EXAMINATION OF CHADWICK L. MARTIN

Rebuttal, Cross, by Northern Plains Resource Council

By Mr. Graybill:

Q Mr. Martin, you're employed by Ecological Resources, is that right -- or Ecological Consulting Service?

A Yes, Ecological Consulting Service, a division of Econ, Incorporated.

Q And is that the company that Mr. Dunkle used to be associated with?

A Yes.

Q But he sold the company; is that right?

A Right. As of a year ago January 1st.

Q How long have you worked for them?

A Since June 2nd.

Q Of this year?

A Yes. Well, no, 1975, June 2nd.

Q You say there on the first page that maximum withdrawals from the Yellowstone do not pose any threat to fish or wildlife. Are you familiar with the fact that Mr. Dunkle testified here that the minimum amount of water that might be in that river in the wintertime might be, what was it, 1000 cubic feet per second or something of that nature?

A Yes. In the testimony it also --

Q Do you remember that testimony of Mr. Dunkle's?

A Not specifically, but I know that the low water flow rates of the Yellowstone goes below 1500 cfs, which is what the permit application for flows allows. The water withdrawal would cease after 1500 cfs river flow rate, so anything below that there would be no withdrawal at all for the power plants.

Q Well, I don't think we understand each other. What do you think the minimum stream flow is at Nichols in the critical year?

A Well --

Q Do you have any idea what Mr. Dunkle has already testified to? I'm just trying to recall those figures to my mind.

A Yes, a little bit. I know that the minimum flow ever recorded in Billings, I think, was 400 cfs.

Q Yes, I'm not interested in that, either.

A And perhaps once a year, one day a year, it might get below 1500 cfs at Nichols.

MR. GRAYBILL: Mr. Examiner, I'd like a five minute recess while I get Mr. Dunkle's testimony.

HEARINGS EXAMINER: Very well.

(BRIEF RECESS)

Mr. Graybill (continuing):

Q All right, Mr. Martin, at the portion of the hearing before the Board of Health, Mr. Dunkle testified that he estimated that the minimum stream flow at Forsyth or Nichols would be 990 to 1000 cubic feet per second. Do you agree with Mr. Dunkle on that?

A Was he implying on a yearly basis, once a year basis?

Q No, this is a critical period. This is the minimum that he would expect at any time. Do you have any evidence to show that that's wrong, Mr. Martin?

A No, I would say that would be a fair value.

Q Okay. Now if you're in a winter situation and the stream flow was 990 to 1000 cubic feet per second at Nichols, is it your testimony that withdrawal of water at that time does not pose any threat to fish and wildlife as you say on lines 22 and 23?

A Well, I don't think the question is fair because there would be no withdrawal at that time.

Q Well, now it isn't a matter of whether it's fair or not, just answer the question. Assuming they were withdrawing water, you would agree with me that that would be detrimental to the fish and wildlife, wouldn't you, if the stream was that low?

A Not even necessarily if it was that low. It would depend on how much water -- naturally the flows get lower than 1000 cubic feet per second and there's still fish and wildlife in the area.

Q And are you saying that it does not pose any threat to the fish or wildlife at that stage, when the river is that low?

A Well, again, it would depend on how much -- can you give me an example? Are you saying 35 cfs withdrawal if the water was flowing at a rate of 1000 cubic feet per second?

Q Mr. Martin, what I'm trying to find out is this. You have made the flat statement that the maximum withdrawal of water for 3 and 4 doesn't pose any threat to fish or wildlife. Now, I don't know the purpose of your coming on at this stage of the game and saying that, but Mr. Dunkle has already testified that the water is going to get as low as 1000 cubic feet per second. He also has testified, if I go through here, that it takes more than that to maintain the ecosystem in the river valley. He admits that that's a destructive rate, if that rate lasted very long. I'm about to take you through Exhibit number 165 and find out if you're familiar with the recommendations of the water group in the Northern Great Plains Resource Program, and what they say is necessary as a minimum stream flow in the Yellowstone River; are you familiar with Exhibit 145, the Northern Great Plains Resource Program?

A No.

Q This is an exhibit put into this case by the applicants, and it has a water work group section in which -- it's called the "Instream Need Subgroup Report," in which they say how much water has to remain in the Yellowstone River to maintain the system, to maintain the ecosystem and to maintain the necessary drinking water for towns up and down the Yellowstone. Now, have you studied this before you've made these statements on behalf of your employer here today?

A Yes. Referring back to Frank Dunkle's testimony, he got his data from the study which the Ecological Consulting Service made, and I've studied that report.

Q But you haven't studied the study that the Bureau of Reclamation made of the river; is that right?

A That is correct.

Q Well, we've been through this with some other witnesses, but for your information they show that on the Bighorn River to Miles City, for example, they need in the month of January 1950 cubic feet per second of water to maintain the ecosystem. Now, that's on page 19 of the "Instream Needs" appendix to Applicants' Exhibit number 165, and so here we have the Federal

Bureau of Reclamation saying that the minimum need is 1950 cubic feet per second and Mr. Dunkle saying that it's going to get down as low as 1000 and I'm asking you, under those circumstances, are you willing to say that it does not pose any threat to fish or wildlife?

MR. PETERSON: To which I will object on the basis that the question as phrased by counsel is an incorrect statement of the applicants' exhibits, particularly with regard to the 1950 cfs. Now that figure is one which has been qualified in the report and which is a suggested minimum stream flow, and the report very carefully points out how that figure was arrived at as are all of the other minimum stream flows suggested in the report.

HEARINGS EXAMINER: Well, the record will show the qualification on it, and, of course, the board is going to have the exhibit for their own construction, and they'll have varying views apparently expressed by counsel in their arguments, but you can answer the question if you're acquainted with the varying minimum stream flows, and then you're using a different stream flow, I guess in your opinion perhaps.

A Right. Also if the minimum -- as far as the minimum stream flow is -- I'm sure they qualified in there how long the water could get to 1500 cfs or 1000 or 1900, so in a question to me, I think you should say how long would it be at that level to where it would cause significant damage?

Q Well, how long does a fish have to have no water before it causes the fish significant damage, Mr. Martin?

A Again, because it's an ecosystem, there's no simple answer; there's no simple question.

Q Well then, why did you make a simple statement that it will not pose any threat to fish and wildlife; is that a true statement? If the water went down one day, wouldn't it pose a threat to the fish and wildlife?

A Well, I think going back to my testimony, it's concern with what is the maximum allowed withdrawal; give him the permit.

Q Well, Mr. Martin, that's true. Now, we'll start over so we'll develop this so you'll understand it. In the Exhibit 165, the instream water group has defined this problem in this manner. It says, "Instream water needs were defined as the minimum amount of water required in a stream to maintain essentially the existing aquatic resources and associated wildlife and riparian habitat." Then they state that the minimum needed from Bighorn River to Miles City -- well, let's say from the Clark Fork River to the Bighorn River, is 1950 cubic feet per second and from the Bighorn to Miles City, 3500 cubic feet per second. That's what they say the minimum need is. They have an optimum need that's higher than that, and I'm not expecting you to agree with that, but are you saying in the face of this evidence that even when the water gets down as low as your former partner in your company, Mr. Dunkle, said it would, namely 1000 cubic feet per second, that there's not going to be damage to the fish and wildlife? Is that your testimony here?

A My testimony would be that the river would naturally get down to that level; it has over the ages, and the fish and wildlife have evolved to temporarily accept and adapt to this sort of condition.

Q Well, are you saying that there's been no damage, natural damage, to the fish and wildlife in the Yellowstone Basin? Doesn't it damage them when the water gets down there naturally?

A Okay. We have to make the distinction between the individual organisms which may die for one reason or another. If the stream naturally dried up or got down to 400 cfs, which it does, there would be fish, perhaps fish killed, but as far as the fish population goes, the fish population has evolved to where the population would survive. The ecosystem is adapted to survive such low flows which may cause damage to individuals.

Q Is that what you mean on line 22 and 23, then, of your statement, that the fish species will survive, but that a lot of individual fish may die?

A No. Any withdrawal below the 1900 or up to the 1500 cfs, there would be no detectable difference. I think if the river was at 1900 cfs, or 1535 cfs, and there were 35 cfs withdrawn, there would be no more fish killed than was already there. I don't think there would be any detectable difference.

Q Well, do you know how many cubic feet of water has to be withdrawn before a fish dies at that level? In other words, isn't it obvious, Mr. Martin, that if you're already below the minimum stream needs that any withdrawal has a tendency to harm the ecosystem? Isn't that a philosophically sound proposition?

A Well, it depends on what you consider the minimum needs -- that's a man-made definition. Naturally the river will get low again --

Q Well, let's take Mr. Dunkle's minimum of 1000, which he says it's going to get to occasionally. If you withdraw water when it's down to 1000, which is clearly a very low level, isn't that going to damage the ecosystem to withdraw water at that level?

A I doubt that it would if there were 35 cfs withdrawn, even at that level.

Q What evidence do you have to base your doubt upon? Have you done any tests? Here's a study that clearly doesn't agree with you. It's way above that. It says you have to have 1950. Now, we've cut that practically in half to 1000, and you're going to take 35 more out and you say that won't hurt the ecosystem? I just want to know what you're really saying. Is that what you're really saying, that there will be no damage to fish and wildlife no matter what happens when there's only 1000 in the river and you take 35 out; you're saying there will be no damage to the fish; is that what you're saying?

A I'm saying that naturally the river gets below 1500 cfs or even 1000 cfs and the ecosystem has adapted to survive such temporary low flows.

Q Well, surely, we understand that, but that's not what your statement says. You're not talking about the species surviving, are you, Mr. Martin? You're talking about the fish surviving on page 1 of your statement, aren't you?

A Well, I think that as far as the permit goes, 1500 cfs -- if there were 1500 cfs flow in January, which is possible -- well say 1535 cfs -- and then 35 cfs were withdrawn, I doubt that the fish and wildlife service could say that any fish were killed due to that withdrawal.

Q All right. Now, let's lower the initial cfs to 1000, like Mr. Dunkle did, and you're still going to withdraw 35; do you still want to say that there'll be no damage?

A I would prefer to say no detectable damage.

Q Well, is that because we're not trying to detect, or do you mean that the dead fish couldn't be seen if you were there?

A Well, I doubt they would find dead fish. And then, as far as an individual fish goes, if the water is lowered and there is damage, it doesn't have to be an actual dead fish or fish killed. Perhaps the fish may not live as long. Maybe there would be something, but it wouldn't be as overt as seeing a dead fish floating down.

Q Okay. So in other words, there can be damage that's not detectable; is that what you're saying? But on the statement you didn't say that. You said, "didn't pose any threats." That means no damage, doesn't it?

A Well, the way science deals on detectable data, for a scientist to make a statement he has to get data which is detectable by the senses.

Q What data did you have when you made this statement, Mr. Martin, that there would be no damage to the fish?

A Naturally the river flow gets below 1500 cfs, or even 1000 cfs, and because this is a natural occurrence, the ecosystem has evolved to withstand this sort of pressure.

Q Are you saying there will be no damage at 1000 now?

MR. PETERSON: Objection. Repetitious.

MR. GRAYBILL: He hasn't answered the question yet.

MR. PETERSON: He answered it three times.

A I said there would be no detectable damage.

Q Well, would there be any detectable damage if the stream flow was at 400, like you said a few moments ago it's likely to reach? You've got 400 cfs in the river and we take 35 out; is there going to be any detectable damage, Mr. Martin?

A Well, I don't think that's a necessary question for me to have to answer because of --

Q Well, is it an impossible question for you to answer? In other words, Mr. Martin, the question I really would like you to answer is, how low do you think the stream has to get before there's damage to the fish and wildlife by taking out 35 cfs?

A Well, I would prefer not to have to answer that, or not to even give my opinion because it's a moot point to me.

Q Well, it isn't a moot point to me. Now, I don't want you to guess, but I want you to either admit as a scientist that you don't know or I want you to tell me what you do know?

A Okay. As a scientist, if the water was down to 400 cfs and 35 cfs were withdrawn, I don't know if there would be any detectable damage.

Q So the fact is, you really don't know any level at which 35 cfs withdrawal would do any damage; is that right?

A Well, I think at a fairly frequent level, the water does get down to a 1500 cfs, for example, one day a year perhaps. I think that the ecosystem, the species and the individuals, are adapted to survive that level. Now, once in 64 years, the water may get down to 400 cfs and that's, to me, a more extreme case. We don't have any data. Just that one time -- I don't know if there were any data reported on whether or not fish were killed, but we do have data as far as what was observed when the water gets down to 1500 cfs.

Q Did you participate in collecting that data?

A No.

Q Have you seen any of that data?

A No.

Q But a minute ago you told me as a scientist, before you would want to make a statement, you would want to have data on which to base it; isn't that what you told me?

A Going back to Jim Posewitz's statement, the Fish and Game would have any data that's available on --

Q No, Mr. Martin, just answer the question if you can. Didn't you tell me that as a scientist you did not want to make statements unless you had data on which to base it?

A Yes.

Q And didn't you tell me that you have not seen the data on what the result on the ecosystem was when the river got to 1500 cubic feet per second? You have not seen that data, have you?

A I think I've seen what data is available, and that is there has been no effect.

Q Did you see a letter from Mr. Posewitz saying that the data was insufficient to determine what the effect would be? Did you see that letter?

A I've seen his testimony which, in effect, says there should be more tests.

Q Do you agree that there should be more tests, as a scientist?

A Well, yes, more data wouldn't hurt.

Q Okay, so since there should be more tests and since you didn't do any of the testing yourself and since you're depending on the tests of someone who says there should be more tests, how can you make the flat statement that there's no damage?

A No detectable damage.

Q You don't say that, you say no damage. You don't use the word detectable in paragraph 2 of your statement. You say it does not pose any threat?

A All right. No threat.

Q How can you make that statement if you didn't collect the information, if the person who did collect information says he needs more testing, and if as a scientist you're supposed to base your statements on tests?

MR. PETERSON: To which I'll object on grounds that it's repetitious and argumentative.

HEARINGS EXAMINER: Overruled.

A I base my data on what the river naturally does.

Q Well, did you study the Yellowstone River yourself?

A No, the data which I've gotten is from the Bureau of Reclamation and the U. S. Geological Survey.

Q Well now, a few moments ago I asked you if you were familiar with the Bureau of Reclamation's major work here put out in 1973 I believe it was or '4, and you said you weren't familiar with this material; isn't that right?

A I'm not familiar with that particular piece of work you have there, but I am familiar with U. S. Geological Survey data.

Q Well, if this group who did a study for the Bureau of Reclamation -- I could show you all of the people who are on it.

There's about 15 of them here, all very highly placed bureau and industry people. If this group found that it took 1950 cubic inches of water in the Yellowstone River between Clark Fork and the Bighorn River, how can you say that taking water out below that level won't damage the ecosystem?

A Because the ecosystem is adapted to withstand that naturally. Naturally the flows get down to that with a fairly frequent frequency.

Q Well, do you argue with their definition which says that this amount of water is the minimum amount of water required in a stream to maintain essentially the existing aquatic resources and associated wildlife and riparian habitat? Do you disagree with that definition?

A Yes.

Q Where is that definition wrong?

A Well, naturally the stream gets lower than that and the existing aquatic organisms are still there; they're adapted to handle it for a short amount of time.

Q What evidence have you got that the amount of time the river is going to stay down that low is one day?

A Jim Posewitz had two exhibits which showed the figures of how long and at what levels the flow rate was, and I think he took the data over a 64 year period. I think he had two stations.

Q Well now, first of all there's no station at Nichols, is there?

A Right.

Q So we don't know what the river flow was at Nichols, do we?

A Right.

Q What evidence do you have that the river never got below 1000 cubic feet per second at Nichols?

A Well, the river has gotten below 1000 cubic feet per second at both Billings and Miles City, and Nichols is in between.

Q What evidence to you have that the time that it was low at Nichols was one day?

A Jim Posewitz's data again. It shows -- the figure showing the flow rates when it gets low is very short; one day is about what it was, and it occurred with the frequency of approximately once a year I think it would get below 1500 cfs.

Q Do you know why?

A Probably ice jams for a short time would plug up the river and then the water would pile up behind the ice jam and below the ice jam there's no water coming in, so it would be low and then within a day the pressure would be so great that the ice jam would break and then the water level would just shoot up the next day.

Q On page 2 of your statement you make the statement that, "Irrigation accounts for the major water withdrawal from the Yellowstone River." Have you found that irrigation is growing in the Yellowstone Valley?

A The data that I've looked at is in the table referred to, Exhibit 282. In years 1966 through '71 it stayed about the same.

Q Well, that's an interesting exhibit and I wanted to ask you a question about it because you say in this sentence, "From 1966 through 1971 the yearly average irrigation water withdrawal was 427,000 acre feet," and you're depending, are you, for that statement on this chart?

A Yes. Actually this is only for these four Bureau of Reclamation projects. It doesn't include others.

Q Oh, you're not saying that it's all the irrigation water withdrawn? Doesn't your statement imply that it's all the water withdrawn?

A Well, actually as far as the testimony goes it would be a conservative estimate. We're comparing 35 cfs to the amount of water diverted. If there was more water diverted for irrigation it would make the 35 cfs even more insignificant, but nobody has --

Q Now, Mr. Martin, you haven't answered my question.

MR. PETERSON: Well, he tried to, Mr. Graybill, but you interrupted him, so I'll ask that the counsel begin to not interrupt the witness and let him answer the question.

Q Let's go back to the question and not worry about the comparison that you're trying to make. I'm trying to find out if you're telling the board that this is all the water withdrawn for irrigation, or if this is only water from certain projects?

HEARINGS EXAMINER: Are you referring to the exhibit or the testimony now so the record is clear.

MR. GRAYBILL: The testimony says, "From 1966 through 1971 the yearly average irrigation water withdrawal was 427,694 acre feet," and then it cites the exhibit as its authority, but the exhibit is limited to certain specific projects, and I'm trying to find out from this witness whether he realizes that the statement he makes is a general statement of an overall average, but the material he cites is specific information from four projects.

Q Do you understand that distinction?

A Yes. If you talk to the Bureau of Reclamation, they don't know how much is being diverted because like farmers, for instance, along the way will take out water and not tell, so nobody knows exactly how much is really being diverted.

Q Yes, Mr. Martin, I have talked to them and I know that's what they say and I've had them here testifying that that's what they say. Now, if they don't know how much water is going out, I was wondering how you suddenly knew how much water was going out, and the answer is that you really don't, do you?

A No, but there's at least that which is given --

Q Right, and I've asked you -- the first question I asked you on irrigation was, are you aware -- or I asked you about the fact that irrigation is actually growing rapidly out of the river. Are you aware of that?

A I have not seen any data to support or contradict that.

Q Well, and the reason that you haven't seen any data, if you've only looked at this data, is because this is for four gravity flow irrigation projects, isn't it?

A Yes.

Q Were you present in the hearing room this morning, Mr. Martin?

A Yes.

Q Did you hear that witness, Mr. Lawrey, talk about the growth of aerial sprayed irrigation?

A Yes.

Q And did you hear him say that it had grown in his area 1000 percent in five years?

A Yes.

Q And did you hear him say that he thought that was probably a reasonable rate to expect it to grow in the Yellowstone River Basin?

A Yes.

Q Do you think that's what's happened in the Yellowstone River Basin, Mr. Martin?

A I don't know. I haven't seen any data.

Q Well then, what are you commenting on how much water is withdrawn for irrigation if you really haven't seen any data? You're a scientist. Now where is your authority for the fact that this is the amount of water withdrawn if you haven't seen any aerial spray data?

MR. PETERSON: Well, that's an improper statement, Mr. Graybill, of the witness' testimony and you've misconstrued it now for four or five different times seeking the same answer. I'll object to the question on the grounds that it is a misstatement of the witness' testimony and is immaterial and repetitious.

HEARINGS EXAMINER: Was that a new question or is there something that you haven't got answered on that, Mr. Graybill.

MR. GRAYBILL: I think it's a new question. I've asked him now; he's admitted that he's heard about the aerial spray problem, but in his statement he just talks about how much irrigation is withdrawn, and I asked him awhile ago if it wasn't true that it was growing rapidly and he said that he had only seen data which showed it was on a level basis and he cited his exhibit here. And now I've asked him if he doesn't realize that there are other types of irrigation than the exhibit refers to, and if in fact he isn't aware of the fact that irrigation is growing rapidly in that area.

HEARINGS EXAMINER: And his answer to that twice has been he's seen no data so he can't agree or disagree, as I understand it; is that correct?

WITNESS: Yes.

Q Well, he said he'd seen no data. Now, having heard the witness this morning, Mr. Martin, are you aware now that in fact your figures are not correct figures for the amount of irrigation nor the trend in irrigation in the Yellowstone River Basin?

MR. PETERSON: Well, of course, counsel, he never has represented that they were the correct figures for the total withdrawal of irrigation in the Yellowstone Basin, and if you'd look at the statement with the attached exhibit, it specifically states that it's water diverted for irrigation for four Bureau of Reclamation projects, and then he goes on to compare what a withdrawal of 35 cfs would be for those projects.

MR. GRAYBILL: You see, Mr. Peterson, that really isn't the tenure of his text and that's why I'm cross-examining.

MR. PETERSON: Well, that may be what you say, but maybe you read it -- you read everything different than a lot of people.

HEARINGS EXAMINER: Well, let's leave that up to the board to read the text. I think your point's made that there are other irrigation withdrawals.

MR. PETERSON: We will stipulate to that.

Q Do you know whether or not there's enough water in the Yellowstone River to supply all the irrigation needs of the Yellowstone Basin, Mr. Martin?

A Again, I'm not qualified to answer one way or the other for that. First of all, you have to define need; second of all you need an expert in another field to make a judgment on that.

Q Do you know how many acres that 35 cubic feet per second will irrigate, either by gravity or by aerial spray, Mr. Martin?

A One acre foot -- one cubic foot per second will irrigate, I think, about 100 acres a year. One cfs is equal to 724 acre feet per year, and this report which Mr. Dunkle referred to came up with the value that it takes approximately six acre feet per year of water to irrigate one acre of land. So just rounding off, 35 cfs would irrigate approximately 3500 acres.

Q So if there was need for the water, the diversion would then eliminate 3500 acres of irrigable land; is that right? That's your testimony?

A No, because the irrigation season is only five to six months long.

Q Well, but of course it's only during that period that the water is involved; isn't that right? We've converted it to how many inches you can take at that time. You don't intend to stop the power companies from taking the water in the summertime, do you?

A Only as far as the permit goes; the permit allows withdrawal until 1500 cfs.

Q Do you know whether -- well, are you saying that it wouldn't take out 3500 acres of irrigated land? Haven't you just done the calculation yourself?

MR. PETERSON: I'm going to object to that question as misrepresenting the witness' statement. He didn't ever say that it's going to take out any acres of irrigated land. He just gave some equations as to what it would equal to irrigate that number of acres.

Q All right. Then let's start from that point. If that's how much it takes to irrigate that many acres, and if you take that many cubic feet per second out of the river, aren't you going to decrease the potential water for irrigation by that amount of acreage, the potential area irrigable by that amount of acreage?

A Well, I'd like to make two comments on that without saying yes or no. One is I'd like to emphasize your word potential, and then second, I'm not an expert in irrigation practices so there are probably other variables which would have to be accounted for before you can make a blanket yes or no statement to whether or not it would take out that many acres of potentially irrigable land.

Q Mr. Martin, how do we know when the river at Nichols is below 1500 cubic feet per second?

A The U. S. Geological Survey has taken data from that station and --

Q What station?

A At Nichols. Essentially --

Q Is there a station at Nichols?

A Well, not a permanent one, but they have taken measurements of the channel and this is where figure 1 comes from. This was made, I think, in 1971. They went out and measured the stream channel depth and then with calculations from the water level as well as the flow rate of the stream the 1500 cfs could be measured.

Q Well, first of all if I understand it, figure number 1 is at Forsyth, is that right, or is that at Nichols?

A No. The text makes it clear that it's three miles west of Forsyth, which is Nichols.

Q And is there a mark on a rock or something that tells us when you get down to 1500 cubic feet per second, Mr. Martin? How do you know when the river gets there?

A Well the USGS has the site and I think they could tell where the water level was and how deep it was.

Q Have you been to Nichols?

A No.

Q You haven't been there?

A I've talked to the guy that got the data.

Q I see, and did he tell you that there was a permanent station there?

A No, it's not permanent.

Q Is it still there? Is the station there now?

A I'm not sure.

Q Well, there's been testimony here that there is no measuring station at Nichols; do you have evidence to the contrary that we should have in the record?

A No.

Q Well then, can you assume with me that there is no measuring station at Nichols?

A No.

Q Okay. You don't want to assume that?

A That is correct.

Q But you have no evidence that there is one?

A That is correct.

Q Can we tell how many cubic feet per second are in the river without a measuring station?

A Using this data on figure 1 it could be told, you know without an official measuring station. All that would be necessary would be to find either the maximum depth or the depth at any one of the points in the stream, and then just figure out how wide the stream is.

Q Has that been done, Mr. Martin?

A Well, essentially that's how a measuring station operates. First they have to figure out the stream channel cross-section and the depths, and then the measuring station just is able to tell the water level; that's the only thing that a measuring station does. It's like you said, it's like putting a mark on a rock, only making it permanent so it can be found. You could do it by a mark on a rock as long as you knew the depths in the river.

Q And I'm just asking you if that's been done?

A Yes, at that one time when this data was taken that's -- the river flow rate could be told.

Q So you're saying that we can tell today whether the river is 1500 feet or not, or how do we tell?

A I think it could be done by just going out at any point and finding how deep the water was. It would be the most convenient, I suppose, to find the deepest point of the water, but because the cross-section of the bottom is known at that point, all it would take is one depth measurement.

Q But you don't know that that's being done?

A Well, yes, I said it has been done, but because there's no permanent, or I don't know that there's a permanent gauging station there, it would be inconvenient for you, for instance, to go out and see how much water is flowing by.

Q Well, wouldn't it be inconvenient for the power company to do it, too, today? You see what I'm getting at is, you talk about the fact that we just stop taking the water when it gets to a certain level, and I'm perfectly willing to go along with that theory, but I want to know how that's going to operate? Do you know how it's going to operate? Is it operating? Is that happening? Do you know, first of all -- I'm not interested in your guesses. If you know, fine; if you don't know, just say so, that's all.

A Well, an extrapolation between Billings and Miles City, I think, would be all that would be necessary --

Q So the way we're going to find out whether we've got to shut the pipeline down at Nichols is to extrapolate between the Billings level and the Miles City level?

A Yes. I think a guage station could be put in there and that would show that the flow rate was the same as the extrapolated value.

Q Do you have any idea what the distance is between those two towns, river distance?

A Well, road miles it's less than 100 miles.

Q And are you telling us that we can extrapolate and decide when to turn on and off the water on the Nichols pipeline on 100 miles of river front, or river bottom?

A I think it's fair.

Q Do you realize that the Bighorn River enters the Yellowstone in that 100 miles?

A Yes.

Q Are you going to throw into the equation the Bureau of Reclamation's control of the dam at Yellowtail; is that how you're going to do that?

A Well, the addition of the Bighorn River should be accounted for at the Miles City station. There would be more water flowing at Miles City than there would be at Billings.

Q And what if they close up the dam, or close it up partly one day; how do we know then?

A Then the river level would drop.

Q What happens if it rains in part of that area and not in the other?

A Well, because water has the properties that it does, there would be, I think, a fairly fast response time. I've worked some with measuring river rises and drops due to Yellowtail Dam, and this is on the Bighorn River, and the response was pretty fast.

Q Is it your testimony that the way we're going to tell whether or not to turn off the water at Nichols is based on an extrapolation between Billings and Miles City?

A I think that would be one way. It would be acceptable. A gauging station at Nichols would be acceptable, too.

Q Do you know if there's any such extrapolations being taken on a regular basis now?

A I know there is data being taken. I don't know if an individual from Montana Power is making the extrapolation every day.

Q Do you think an individual from Montana Power is the person who should be making that test, from the point of view of safeguarding the river ecosystem?

A Well, I don't know if I'm qualified to answer that question. The state seems to think that Montana Power is responsible enough to have to carry out its own research in quite a few areas, and so perhaps Montana Power would also be responsible enough to make that extrapolation.

MR. GRAYBILL: All right, Mr. Martin. Thank you.

HEARINGS EXAMINER: Mr. Sheridan.

Rebuttal, Cross, by Department of Natural Resources and Conservation

By Mr. Sheridan:

Q Mr. Martin, is this your first job since graduation?

A Yes.

Q And you've never been to Nichols?

A That is correct.

Q And you've never personally conducted any tests on the Yellowstone to determine the amount of suspended solids during low flows at Nichols, have you?

A That is correct.

Q And it's true that minimum flows do not occur during the irrigation season of the year; isn't that true?

A Yes, the lowest flows, that's true. Because of irrigation there is a significant reduction. There's like two lows during the year, but the lowest is usually in the winter months.

Q Yes. So you don't have an additional drawdown during the period of low flows as a result of irrigation, do you?

A That is correct. The lowest flows -- in August the river is down and irrigation does significantly add to the drawdown then.

Q But the flows are lower during the winter months, aren't they?

A Generally, yes. It is possible that they not be.

Q And it's also true, isn't it, Mr. Martin, that during periods of low flow, the ecosystem is most vulnerable to disturbance, occasioned by drawdown?

A Yes.

MR. SHERIDAN: Nothing further.

HEARINGS EXAMINER: Mr. Peterson.

Rebuttal, Redirect, by Applicants

By Mr. Peterson:

Q Despite the fact, Mr. Martin, that the potential exists for some low flows, it's still your position that the withdrawal of 35 cfs from the river, based upon the historical data and the fact that the ecosystem has survived, will not damage any fish or wildlife; it will not cause any detectable damage to any fish or wildlife?

A That is true.

MR. PETERSON: I have nothing further.

HEARINGS EXAMINER: Mr. Graybill.

MR. GRAYBILL: That's all.

MR. SHERIDAN: That is all.

HEARINGS EXAMINER: Do any of you gentlemen have any objections to the offered exhibits, Applicants' 280, 281 and 282?

(No objections)

HEARINGS EXAMINER: Very well, they're admitted. Let's take a 5 minute recess before we take the next witness,if we may.

(RECESS AT 3:06 P.M.)

The hearing was reconvened following a brief recess, at 3:15 P.M.

HEARINGS EXAMINER: Mr. Peterson.

MR. PETERSON: Mr. Davis, we now present the testimony of Robert J. Labrie and we'll also ask that Applicants' Exhibits 267, 267-A and 267-B be admitted into evidence.

ROBERT J.LABRIE, called as a rebuttal witness by the Applicants, having previously testified in the matter, and having been previously sworn upon his oath, both as to his written and oral testimony, was examined and testified as follows:

(THE WRITTEN DIRECT TESTIMONY OF ROBERT J. LABRIE WAS DIRECTED TO BE INSERTED AT THIS POINT.)

March 23, 1976

STATEMENT OF TESTIMONY OF
ROBERT J. LABRIE

My name is ROBERT J. LABRIE. I have testified previously in this hearing. The purpose of this testimony is to present rebuttal evidence to a part of the testimony of Dr. Albert Tsao and Dr. Alan Morris, and also to present a typical study made of site selection by Montana Power.

On page 7 of Dr. Tsao's direct testimony, he has the following statement:

> "(2) The utility companies in the Pacific Northwest have pursued vigorously the building of either coal-fired power plants or nuclear plants near their load centers, suggesting that a load-center generation plant is a more desirable alternative than a coal-fired, mine-mouth generation plant."

He then lists some of the nuclear plant sites that have been approved or are in planning in the states of Oregon and Washington, a site which might combine both nuclear and coal-fired generation in Washington and a coal-fired site in North Central Oregon. From this he concludes on page 11 that:

> "This is among the best evidence and most convincing proofs that load-center plants are better alternatives than coal-fired mine-mouth plants,..."

The facts that Dr. Tsao uses to support his conclusion in fact support the opposite conclusion. The plant sites that he discusses were all selected for many reasons but an important one was that they were either remote from the urban centers or mine mouth locations. This is a required criteria for the selection of nuclear sites.

The Applicants' modern coal-fired sites are Jim Bridger, Colstrip, Dave Johnston, Wyodak and Centralia. These are all mine mouth sites. The Boardman site which Dr. Tsao refers to was originally selected as a nuclear site. The application was then revised to make it a coal-fired site because it could not be certified in time as a nuclear site. However, Portland General Electric Co. may also develop it in the future for nuclear generation. It is in a remote area of North Central Oregon. Apparently the Siting Councils of Oregon and Washington have concluded that power plants should be sited in remote areas rather than urban centers.

The Colstrip site was selected for Units 3 and 4 for various reasons among which were that forty percent of the power was to be used in Montana and there was already an existing mine mouth site for them. Specific studies for this site indicated that this was the most economic location (Exhibits 16 and 17).

Dr. Alan Morris indicates that the Colstrip units should be located at the load demand center. He argues that the Colstrip site is more energy intensive and cites several general studies as proof (page 12). Actually, in the specific situation of comparing the Units 3 and 4 Project at Colstrip with a similar one near Spokane, the energy loss difference between the two sites due to electric transmission is nearly identical with the energy consumed from shipping the coal from Colstrip to Spokane (3.90% vs. 3.85% of the energy produced by the plant). The difference in transmission losses are so low because of the existence of the present transmission system and the fact that 40% of the power would have to be brought back into Montana if the plant were located in Spokane. In the case of the Colstrip location, however, the transmission losses are made up by burning additional coal while for a plant at Spokane, the energy to transport the coal would come from the diesel oil used in the locomotives, an expensive use of a scarce commodity.

On page 14 of Dr. Morris' testimony, he refers to "Coal Liquefaction - High Efficiency, Coal Gasification - Moderate Efficiency and Coal Fired Power Plant - Low Efficiency". This, of course, does not take into account the fact that the resulting products from the first two processes still have to be converted to heat. A gasification process would be 60-70% efficient, but when converted to heat in a home or factory, its overall efficiency is reduced to 30-35%.

Dr. Morris on page 14 of his testimony also refers to Bechtel Corporation as participating in an Energy Transportation Systems, Inc. (ETSI) publication on slurry pipelines and on page 16 apparently suggests that this transportation method to some other location be an alternative to Colstrip 3 and 4.

I met with the Bechtel slurry pipeline expert on October 27, 1970 to discuss the economics of this type of transportation. In 1970 they were looking at a plan to transport coal from Montana or Wyoming to Minneapolis. The economics indicated that they would need a constant market in excess of 20 million tons per year to make this method of transportation more favorable than hauling coal by rail since the rail already existed. As I recall when we discussed the possibility of a slurry pipeline toward the Pacific Coast, the economics of rail shipment was judged still more favorable than slurry pipeline due the cost of building a pipelin to the pressure differences going over the mountains and/through the rough terrain. On this basis, we did not consider pipelines further when studying Colstrip 3 and 4. The ETSI Report, dated October 1975, indicated that they now consider a pipeline to break even economically with rail haul at 8 million tons per year over flat terrain. Since the maximum coal delivery for Colstrip Units 3 and 4 would be 5.5 million tons per year, it is still not economical. In addition to this, eminent domain is not available for a coal slurry pipeline in Montana and the State Legislature in 1974 passed a law prohibiting the use of Montana water for slurry pipelines to export coal from Montana, so it cannot be a viable alternative for Colstrip Units 3 and 4.

Inferences have been made in this hearing by the opposition to the lack of adequate studies by Montana Power relating to alternative sites in Montana. I have previously testified regarding the alternative studies, but at this time I would like to supplement that testimony with specific examples. Applicants' Exhibits Nos. 267, 267A and 267B are typical of the many site selection studies made prior to the final selection of the Colstrip site. They are but one example of many similar studies.

Applicants' Exhibit No. 267 is a site comparison study which compares sites at Colstrip, Springdale and Cushman using cooling towers and cooling ponds. Applicants' Exhibit No. 267A is an example of the data required to study each individual site, in this case Cushman. This is only one of many case studies performed for the Cushman site. Applicants' Exhibit

No. 267B is an example of a computer run for a case study of the Cushman site.

Included in Exhibit No. 267B (computer run) are the following: a tabulation of capital investment by years; a load resources tabulation by months that shows the fuel used by each plant and the purchases and surpluses available for sale; a tabulation of the expenses for this case including fuel, operation and maintenance, property taxes and purchases and sales of power; a tabulation of revenue requirements by years including book depreciation, tax depreciation, return on investment, income taxes and expenses (the annual revenue requirements are presented both in actual dollars and in discounted dollars).

EXAMINATION OF ROBERT J. LABRIE

Rebuttal, Cross, by Northern Plains Resource Council

By Mr. Graybill:

Q Mr. Labrie, I'm looking at your statement on page 1, and in the last line thereof, you point out that certain plant sites were selected for many reasons, but an important one was that they were remote from urban centers. Now, on the next page, you disclosed that obviously the nuclear sites are built remote from urban centers. I suppose that's for a safety reason, is that right?

A No, at least speaking for the work that we did in Montana Power in planning the Colstrip site, we thought that locating in the Colstrip area was advantageous from the point of view that it didn't have as big an impact on people as if we had put it in some place like the city of Billings.

Q My question, Mr. Labrie, was that I take it your sentence at the top of page 2 concerning nuclear plants implies that nuclear plants are built away from population centers for safety reasons.

A That's correct. The general federal policy, at least until this time, has been to locate them in more rural areas, and there's been a lot of debate on whether they should allow them in population centers, and to date, they haven't done it.

Q Is that same policy in effect as concerns coal-fired plants?

A Not to my knowledge.

Q So there isn't any federal safety reason that you couldn't build the coal-fired plants in the load centers?

A That's correct.

Q Why, then, do you think the coal-fired plants which you refer to in the last line of page 1, were built remote from the urban centers?

A For the same reason that we moved out of the city of Billings and chose a location other than in the city of Billings for our addition after the Corette unit, because there's already quite a lot of pollution and the impact of adding a plant, even if it's going to have very good pollution control equipment, I believe, is undesirable in a city, compared to a more remote area.

Q So it's to move the pollution potential of the plant into an area that's not polluted so that you won't have to fight the existing pollution in your standards, is that the reason?

A So that we won't have to superimpose what pollution we do have on top of an already polluted situation.

Q And is that the reason that plants in Washington and Oregon are built at remote areas? Coal-fired plants?

A Well, I think we'd have to take the specific coal-fired plants to answer the question.

Q Well, you have discussed in the first paragraph -- in the second paragraph, I guess -- you've discussed the Portland General's plant, the Boardman plant, and you've pointed out that it's in a remote area, right?

A Very remote, yes.

Q So there really are remote areas available in the state of Oregon where these types of plants could be built if they have a load problem, isn't that so?

A I didn't hear the last of what you said.

Q If they have an energy problem, there are sites in the state of Oregon where their siting authority has seen fit to allow them to build coal-fired plants?

A That's correct.

Q Did you consider the Boardman site as a possible site for building the Colstrip plants?

A Yes. I believe we've testified that we did some early studies looking at shipping coal to Boardman rather than building Colstrip.

Q You're familiar, are you, with the studies done at Boardman that showed that they can ship coal from Wyoming to Boardman and still come up with a cost ratio that's better than Colstrip's?

A I'm familiar with the fact that Neil Woodley subsequently testified that it was more economic to locate at Colstrip than it was to ship coal from Colstrip to Boardman.

Q So you aren't familiar with the other exhibit that was put in that had the Boardman comparison between Colstrip and Boardman?

A I didn't hear you.

Q There's an exhibit -- I don't know the number now -- that compares Colstrip and Boardman in terms of costs. Are you familiar with that exhibit?

A As I recall, there is one, yes.

Q What you're telling the Board here then, is that it would have been possible to build the Colstrip plant at Boardman, in terms of a remote site that was satisfactory to the state of Oregon siting authority?

A Boardman would be an alternative site to Colstrip, yes.

Q Isn't Washington Water Power planning a new coal-fired plant in Idaho?

A I don't know about it if they are.

Q You mention on page 2 that there were various reasons for selecting the Colstrip site. Was one of those reasons to sell the Colstrip coal?

A Not as far as I was concerned. I headed up a planning team that attempted to find the most desirable location to put a plant site and there was no consideration whatsoever upon the part of the planning team in their recommendation that we locate at Colstrip because it would sell Colstrip coal.

Q So you disagree with Mr. O'Connor, who did cite that as a reason for building the plant at Colstrip?

A I don't know. That might have been one of Mr. O'Connor's reasons. I can't recall what he said.

Q When did this team that selected the Colstrip site meet?

A Pardon me?

Q You said you headed up a team that selected Colstrip as the site?

A Yes.

Q Are you talking about Colstrip 1 or 2 -- 1 and 2 or 3 and 4?

A I'm talking about Colstrip 1 and 2 when I made those remarks.

Q What year, what part of the year?

A That would have been about 1970.

Q And that was before the Siting Act was enacted?

A That's correct.

Q Therefore, I take it, the environmental requirements of the

Siting Act were not considered by you in that particular selection?

A No.

Q By no, you mean that's correct, that you didn't consider the elements in the Siting Act?

A Due to the fact that there was no Siting Act, we did not consider the Siting Act.

Q Were you on the team that selected the location for Colstrip 3 and 4?

A Yes, I was working with the task force.

Q The Butte bunch that decided to build the second set of plants there, you were part of that?

A Yes.

Q When did that group consider the site?

A We began our studies in August of 1972 and a general feasibility study was completed in December of '72, and I believe that's one of my exhibits, and then each of the companies took a look from its own point of view of the economics of the proposal, and the Montana Power's study was completed in about April or May of '73, and as I recall, I presented it to the Board of Directors in June of '73.

Q Actually, some of the engineering, C. T. Main, for example, was hired in December of '72, isn't that right?

A That's correct. We hired both Charles T. Main and Bechtel, to a limited extent, and Westinghouse on environmental studies, to further our knowledge for feasibility purposes, before we made our final decision.

Q This was done by December of 1972?

A No. As I recall, at least, Westinghouse was hired in January or February, and I think Charles T. Main, also. I may have had --

Q I happen to know from my other hearing that C. T. Main was hired in December, initially, and the contract was formalized in January, but isn't it true that by December 1972 you knew that 3 and 4 were going to be built at Colstrip?

A No, I think we knew that the general overall feasibility would indicate that Colstrip was desirable. The Montana Power had not done its firm economic work, and we certainly believed that we would have to look at it from the point of view of Montana Power before making our final decision.

Q Wasn't there, at least, a tentative decision to build 3 and 4 at Colstrip by December of 1972?

A There was a tentative decision that it was probably feasible.

Q Now, that was, of course, before the Siting Act was enacted, isn't that so?

A That's correct.

Q And so I take it your answer would be the same that at least as far as the tentative plan to build Colstrip 3 and 4 at Colstrip is concerned, the elements of the Siting Act were not considered in that selection?

A I think that would have to be true. We suspected there would be a siting act, but at that point in time, we didn't know anything about it, so I surely can't say that we considered the specific Siting Act that was passed; in fact, the regulations pertaining to the Siting Act didn't come out until 1974, as I recall.

Q And before that time, it is true that Colstrip 3 and 4 had been located definitely at Colstrip, isn't that right?

A That's correct, and we had proposed it to the Governor in May of 1973, so this was long before the regulations came out.

Q In a sense, we have here a plant or two plants that were designed and planned almost, you might say, coincidentally or at the same time as the Siting Act was being considered by the legislature, so that in many respects, the siting of Colstrip was decided apart from the Siting Act elements, isn't that right?

A Colstrip location was under construction before the Siting Act was contemplated.

Q Well, but even on 3 and 4, it's true that the planning for 3 and 4 was coincidental and taking place at the same time as the legislature was considering the Siting Act, isn't that right?

A There was planning going on coincidental with the legislature's activity, and we hired Westinghouse to do an environmental analysis for us prior to full knowledge of what kind of a siting law would be passed.

Q So in a sense, a good deal of the planning for Colstrip 3 and 4 really took place before we had the elements of the present Siting Act to test by, isn't that right?

A Those are generalized words, Mr. Graybill. There was some planning done prior to the time that we knew what we would have to comply with with the Siting Act, that's correct.

Q Now, on page 2 of your statement, you say, concerning units 3 and 4: "Specific studies for this site indicated that this was the most economic location." By economic, do you mean the cheapest location?

A I mean that it was the lowest cost alternative on an evaluated basis.

Q What consideration was given to the long-term agricultural losses that might occur in the Colstrip area when you made this decision that it was an economic location?

A We discussed the fact that we would very definitely have to meet all of the environmental requirements of the Siting Act and the existing standards at the time and the federal standards besides, and we assumed that by meeting all of these requirements we would be complying with the necessity of protecting the area.

Q I don't doubt that you intended to comply with the Siting Act when it was passed, but I have asked you, really, a different question. What consideration was given to the long-term agricultural cost of locating the plant in the Colstrip area?

A We retained Westinghouse Environmental Systems in January of '73 and part of their expertise was to make an analysis of this and judge the impact on it for us, and they concluded that the impact was minimal.

Q In other words, the Westinghouse people felt that it wouldn't make any difference to the agricultural community around Colstrip if the plants were built?

A I believe that Westinghouse concluded that the impact would be insignificant.

Q Well, if it's insignificant, I take it that means it wouldn't make any difference?

A I think the Colstrip activity is an asset to the surrounding agricultural community.

Q And you think that's what Westinghouse found, too?

A They didn't come up with any indication that there was anything derogatory that would be significant.

Q So the answer is that there was not any -- in weighing the economics of Colstrip 3 and 4, there was not any weight given for long-term agricultural detriment?

A That's not what I said, Mr. Graybill.

Q Well, I'm asking you if there was any weighting or any cost associated with long-term agricultural detriment --

A There was no cost associated because the conclusion was that the problem was insignificant.

Q What analysis was made in calling it an economic project for the economic losses that would result from the building of the two 500-kV transmission lines for 408 miles across Montana?

A This, again, was addressed in the Westinghouse report.

Q And did the Westinghouse report find that there was economic detriment to the agricultural community to Montana by building the two 500-kV lines through Montana?

A As I recall, they concluded that the economic disadvantage from locating the transmission lines would be insignificant, and our electrical study shows that the advantages in building the two 500-kV circuit right through the center of our system so we can tie electrically together Billings, Helena, and Hot Springs, is a very big advantage to us in the future, so that from an electrical engineering point of view, I was highly in favor of it.

Q Surely. I can understand that from an electrical engineering point of view, it was a smart move, wasn't it?

A Yes, because it will enable us to serve our customers well in the future and with a minimum of additional transmission in the future, so that the actual impact of transmission in the future is going to be less by having these 500-kV lines than if we didn't have them.

Q I understand that, Mr. Labrie, but I'm trying to ask you about a different field, so think with me for a moment about this other field and that is, economic detriment to the agricultural community, and you say that the only analysis made of that prior to siting 3 and 4 at Colstrip was the Westinghouse analysis?

A Prior to siting 3 and 4, that's the only one that I can recall -- wait a minute -- Charles T. Main was also retained, and they were doing studies in this area.

Q Did they find that there would be a detriment to the agricultural community by building the lines through the fields?

A I know of nobody that found a detriment.

Q So in other words, when you say that the plant seemed to be the most economic, you're saying that from the point of view that there would be no negative economic detriment to the agricultural community, either along the transmission lines or at the site?

A I'm saying that the benefits of having the transmission lines outweigh the ground that would be used by putting towers on the route.

Q Well, I don't think that's too arguable, but what I'm asking you is, what weight was given to using up the tower sites, for example? Did you count the amount of money that people are going to lose from not having the tower sites when you figured the economic value of this plant?

A I did no such study, no.

Q And you don't know of anybody that did any study of the real cost to the agricultural community of the plant?

A I have already testified that Charles T. Main and Westinghouse provided transmission line information, and it's in the record, and I don't recall what precise detail is in there.

Q But you don't recall that they assigned any negative weight to the plant or the line, any negative economic impact?

A Well, I'm sure that they discussed what land was required to put the towers on, if that's what you're referring to.

Q On Exhibit No. 267, the first line up there says "Installation schedule, based on maximum imports of 200 megawatts above existing contracts." What does that phrase mean?

A Well, that means that we made an assessment of the interties, the transmission interties that we had with our neighbors to the west, and south, and determined that the maximum limit that we could bring power in was 200 megawatts over and above what we were already bringing in, so that if we were to come up with a plan that would require more than that, we'd have to do -- incorporate into that plan some additional capital expenditures.

Q Okay, that's an analysis of capacity rather than of need, is that right?

A That's correct.

Q On the first page, where there's the handwritten charts, the third page over on that exhibit, I take it that compares 1, 2 and 3 units -- I understand that originally there was a plan for 3 350-kV units. What does it mean when it says in some of those columns, "With supplemental sales"?

A With surplus sales. We looked at the economics of the development in Colstrip 1, 2 and 3, as it's described here, or 350-megawatt plants 1, 2 and 3, at Colstrip and other locations, on the assumption that each time we put a power plant on, we would delay bringing power in until such a time as we were having trouble with our transmission lines, our 200-megawatt limitation, and not have to put a plant on, so we dealt with the economics of those surpluses on two bases, one to assume that we couldn't sell any of them, and the other to assume that we could sell 50% of the surpluses.

Q So that was just two assumptions you made?

A That's correct.

Q Now, the numbers, 1, 2 and 3 that are assigned to these various plants, who assigned those numbers?

A This is just a result sheet that shows that assuming just 1974 to '85, for instance, Colstrip 1 was the lowest cost alternative, Springdale was the second and Cushman was the third.

Q I can see that from the chart, but my question is, who assigned those numbers?

A Well, the manager just tabulated from looking at the sheets behind. I suppose some clerk, or maybe I did it. I don't remember.

Q In other words, you analyzed all of these costs and then you picked out the one that was the lowest and the second lowest?

A That's right, this is just a tally sheet.

Q And Springdale -- is that near Livingston?

A Yes.

Q Where is Cushman?

A Cushman is the point at which the Milwaukee and the Burlington Northern cross near Lavina and Ryegate, and the reason we were looking in that area was that we were concerned about railroad freight escalation in the future and we thought if we could get a plant site location where there were two railroads available, we might be able to control freight rates better than with just one.

Q You didn't look at the environmental impact of building a plant there in the Lavina area?

A Well, we considered water, certainly. This was one of the detriments to that area.

Q Did you consider seriously, and I don't mean just in passing, because I'm sure in passing you might have considered any number of places, but did you consider seriously any other places except Colstrip, Springdale and Cushman, in the state of Montana?

A Yes, that's in my direct testimony. There are a number of pages on it. Do you want to hear them again?

Q You might just refresh my recollection on these cities.

A Okay, as I recall, we started with Townsend, and we were thinking of locating a plant at the upstream end of Canyon Ferry Lake and the possibility of running part of the Missouri River through the plant and using Canyon Ferry Lake as a cooling pond. We also considered Clarkston, which is a rather deep canyon, and it's a site between Trident and Townsend, and we considered a site near Trident and we considered one at Three Forks and we did an economic study on all of these, and then we went over to Livingston on the other side of the hill and did some at Livingston, Springdale. We looked at five sites in the Livingston-Springdale area and then five or six sites around Cushman, as I recall, and about eight sites around Colstrip, and we looked at Nichols, and did some evaluation and visited each site and cogitated on how we could develop each of those locations.

Q Were these considerations made for 3 and 4 or 1 and 2?

A Those were for 1 and 2, and that's what this exhibit is.

Q There being no Siting Act then, and in fact, at the time of 1 and 2, no real prospect of one, did you consider the environmental impacts at these points?

A Yes. In the case of Townsend, we visited with the FAA meteorologist and discussed the difficulty that they were having in the East Helena area and considered the possibility that we would have the same sort of difficulty around Townsend because they were having inversions, and this was a big factor in our deciding to stay away from that location. In the case of Clarkston, we were in a deep canyon, and even though it was extremely remote and there weren't any people around there, we again were concerned that our plume rise would impact upon the canyon walls and damage vegetation and that this probably would be a troublesome area. In the case of Three Forks, at the time, the Ideal Cement Company was a rather heavy polluter in the area and we could see that the emissions were carrying over into the Bozeman Basin, and we felt that Bozeman was a bowl similar to the situation that exists in Los Angeles, and if we were to locate a plant upwind from Bozeman, we might run into a great deal of difficulty in the future, so we moved away from Three Forks. This got us to Livingston and we felt that east of Livingston was probably a good location from the air pollution point of view, but we had some difficulty with water. When we got to the Cushman area, we looked at many sites and one of them was -- is it Dead Man's Lake? I think it is -- it's a lake that the Fish and Game has stocked, and we thought that might be possible, but perhaps difficult, and water from the Musselshell River was rather unobtainable, so we felt that if we were going to locate there, we'd have to do a much deeper study. As it turned out, our economists said that Colstrip was more desirable from an economic point of view. When we looked at Nichols, we were considering once through cooling, and decided that we'd better avoid that with the continuing change in the legislation, and there was an esthetic problem with locating the plant right next to the interstate highway, and it would probably be undesirable, so this was another reason why we felt that there was less against Colstrip than any place we'd looked at.

Q How many places outside Montana did you consider seriously?

A As I have mentioned to you, we discussed with Portland and met with them several times and did some cost studies on Boardman versus Colstrip, and this was the extent of our outside work.

As has been the testimony many times, we were part of the joint power-planning council and there were power plants needed in every area and the other companies were already attempting to develop some of these areas.

Q Was your consideration of the Boardman site in conjunction with 1 and 2 or 3 and 4?

A This was while we were doing the studies for 3 and 4, as I recall.

Q That's the only place outside of Montana that you seriously considered?

A We have had conversations about a location that Washington Water Power might develop some day.

Q But that's why I'm saying seriously considered -- I mean you did in-depth studies. You may have discussed it with a lot of people, but I want to know the ones that were seriously considered.

A No, we were trying to develop power for Montana, and our studies were within our service area.

Q When you designed 3 and 4, you were still trying to develop power for Montana?

A Yes. We own as large a share as anybody does, and 40% of that power will stay in Montana.

Q If you had not sold half the rights in 1 and 2 to Portland, would you have needed 3 and 4 -- to Puget, I'm sorry.

A Not as soon, but we need plants there if our load continues to grow. If we were to build two 350's and run both of them, instead of running half of each, of course our reserve requirements would go up and the cost would be tremendously greater for us, but presumably we could have done that sort of a thing. Instead of doing it, I think we would have built 180-megawatt plants when we were in there by ourselves.

Q Well, you don't mean that it would have cost more for you to build -- for the Montana Power to build 1 and 2 alone than it would have cost them to build half of 1 and 2 and its 30% of 3 and 4, do you?

A Yes, I do.

Q 1 and 2 will cost more than 1 and 30% of 3 and 4?

A What I'm saying is that the reserve requirements that the Montana Power wants to take on 350-megawatt units by itself, is much greater than if we built two plants and take half of each, because then we have 165-megawatt units instead of 350's.

Q Mr. Labrie, you're talking about a different thing. I asked you if it would be cheaper, dollar-wise, and are you telling me that it's cheaper dollar-wise to build 1 and 2 than it is to build 1 and 30% of 3 and 4?

A Didn't you reverse what you were trying to say?

Q Wouldn't it have been more inexpensive for the Montana Power Company to build 1 and 2 by itself -- I'm not talking about the timing, but eventually -- than it would be to pay for half of 1 and 2 and 30% of 3 and 4?

A If they were all on the same time frame, and all had the same pollution control equipment and so on, the economies of scale would be such that the unit cost of what we were investing in for 3 and 4 would be less than the unit cost of what we're investing in 1 and 2, so I believe the answer to your question is that it's cheaper for us to take half of units 1 and 2 and

30% of units 3 and 4 than it would be for us to build all of unit 1 and all of unit 2, and when you take into account the value of money, it's much cheaper, because we would have had to spend all the development cost by ourselves for unit 1.

MR. GRAYBILL: I think that's all I have.

Rebuttal, cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q Mr. Labrie, is any coal-fired station built mine-mouth except for Centralia in the Pacific Northwest?

A I'm sitting here, Mr. Shenker, trying to figure out what the Pacific Northwest is for sure.

Q Okay, tell me about any coal-fired generating station that's built mine-mouth in the states of Oregon, Washington, Idaho, or Montana, aside from the Centralia plant?

A The Jim Bridger plant -- oh, no, wait a minute -- they're across the border in Wyoming.

Q They're in Wyoming, yes. Are they in the West Group?

A I believe they are. I'm not positive.

Q Mr. Labrie, in your statement you say that major fossil fuel stations are built either remote from population centers or mine-mouth, right?

A That seems to be the case at the present time, yes.

Q That is an extraordinarily misleading statement, isn't it, sir?

A Pardon me?

Q That's an extraordinarily misleading statement, isn't it?

A No.

Q Well, Mr. Labrie, where are the load centers on the west coast?

A Generally, west of the Cascades.

Q How far from Centralia?

A All right, Centralia is a mine-mouth plant and it is west of the Cascades, but it is at the mine and that's why its location was there. Its location was not there, as Dr. Tsao seemed to indicate, because it was in a load center.

Q Is it a load center, or isn't it?

A Yes, it's fairly close to a load center.

Q It certainly is, isn't it?

A Correct.

Q Yes, indeed, and if you look at the Boardman plant which PGE is the sponsor of, that's almost equi-distant, isn't it, from all three of the load centers of the Pacific Northwest, Spokane, Seattle, and Portland, isn't that true?

A Boardman is quite remote, transmission-wise, from any place that you can tie it in with a heavy system, and it's going to cost a good deal of money transmission-wise, to put it into the system, and it was located there because it's remote, and it's not in a load center, it's in a rural area.

Q Now answer my question.

A I haven't measured the distance from Spokane to Boardman and Portland to Boardman and Seattle to Boardman, but as far as I'm concerned, it's moot. If it's the same distance, so be it.

Q Mr. Labrie, if it's true that Boardman is so remote from Portland, transmission-wise, then how much truer is it that Colstrip is remote from Portland, transmission-wise?

A 40% of the power from Colstrip gets dumped in Montana, and we have done studies, as we've testified, on the costs for Boardman versus Colstrip.

Q Mr. Labrie, let's stop playing games. Let's look at the figures and the evidence both. First, with respect to how far it takes a transmission line to go from Colstrip to Portland, is it further than to go from Boardman to Portland?

A Obviously --

Q Yes or no!

A Obviously it's further,and we wouldn't think about building a transmission line from Colstrip to Portland; in fact, we studied it and we rejected that as totally non-economic.

Q Good -- how long is the transmission line you propose to build?

A I can't recall, but it must be 600 miles.

Q How far is it from Boardman to Portland?

A I don't recall.

Q Is it 600 miles?

A Probably 300.

Q Oh, about half the length?

A Yes, that's right.

Q Now let's look at the 40% figure that you've just bandied about and that you also tossed into your statement. Tell me how 40% of the power from Colstrip 3 and 4 has been allocated to Montana-based utilities. Is that the case?

A As you know, Montana Power owns 30% of it and we fully intend to use that 30% in Montana, and Pacific Power and Light owns 10% and they fully intend to deliver that to their nearest customer customers, which would be in Montana.

Q Well, you know that that isn't true, don't you, Mr. Labrie? You know that you right now are forecasting surplus sales from the Montana Power Company and you know, as you sit in that chair, that you're not going to use 30% of Colstrip power in Montana, don't you?

A We wouldn't be building Colstrip if we didn't intend to use all of the power in Montana. It's certainly not economical. The rest will depend on wholesale sales outside. The reason we built it is to take care of load growth. You can't build a plant that meets your load growth exactly, or you'd have to build a plant every year, so the first two years you put a plant on the line and it's got surpluses, and eventually they get used up and you have to build another plant.

Q The fact of the matter is, Mr. Labrie, on the load forecasts which you have submitted in this proceeding, for every year through 1986, you forecast surpluses as the result of surplus sales so that you will not use 30% of the Colstrip power in Montana. Now, isn't that true?

A As I recall, we show a deficiency in 1979 on energy and --

Q Oh, come on, Mr. Labrie. Nobody thinks that 1979 is involved in this proceeding. You can't put Colstrip 3 on until 1980 in the middle of the year. Now, let's talk about July 1980 until the year 1986. Is it or is it not true that you will not use 30% of the Colstrip units here in Montana for that period of time?

A We won't use all of that power before 1986, but we do have to have deficiencies without Colstrip and it's going to take until 1986 to use these up with our normal load growth, and in the meantime, we'll sell the surplus.

Q Well, since you're going to be selling surplus, then it's false, isn't it, to say that you're going to use 40% of the Colstrip power here in Montana?

A No, sir, because after 1986, we're going to need more power than that.

Q Oh, indeed? Now we're turning this into a proceeding beyond the decade from 1976 to 1986. We're now looking at the decade from 1986 to 1996, is that it?

A What I'm saying is that after 1986, according to the present load forecasts that we have, we're going to be deficient again, so over the life of that plant, we're surely going to use all of that power in Montana.

Q Well, then, Mr. Labrie, if, indeed, we're going to be looking at the year 1986, you'd better bring in some load forecasts for that year, because you don't have them here now. You stop in 1985.

A Those aren't a matter for this hearing, are they?

Q No, I didn't think so, so why did you just bring them up?

A Because you said we're not going to use the Colstrip power in Montana, and surely, we're talking about the life of the plant, aren't we?

Q Oh, indeed? Now we see what your statement really means, then, Mr. Labrie. Let's turn to it and let's put it into the language that you now believe is correct, Page 2, line 15, what you really meant to say there was, "The Colstrip site was selected in 1970 for units 3 and 4 for various reasons, among which were that in 1987, 40% of the power would be used in Montana." Now that's what you really meant to say?

A By 1987, we would have used up all of the power that will go into this plant. Now, the other alternative to this, Mr. Shenker, is to build smaller plants, much smaller, and granted, we could build a 25-megawatt plant and put two of them in a year, and every year keep building plants, but it would not be the lowest cost alternative for our customers, and we believe that this is one of the things that we have to address ourselves to.

Q Let's just take a look at lowest cost alternatives, then. There are lots of folks who have that responsibility, aren't there, among state and federal agencies addressing those kinds of questions, right?

A I guess so.

Q One of those folks, for example, would be the Oregon Public Utility Commissioner, looking at rate payers for a couple of your applicants, PGE and PP&L, right?

A Perhaps.

Q Didn't you know, Mr. Labrie, that the Oregon Public Utility Commissioner's staff has already determined that PGE will have to have deleted from its rate base the cost of the Colstrip facility because it is more expensive for PGE than operating all of its existing facilities? Did you know that?

A I think that you'll have to repeat that. You said something about the Public Service Commission's staff -- did you say they make the determination?

Q No, the Public Utility Commissioner's staff.

A I don't know what they came up with. I have seen none of it. I do know that there are some people on the staff who are against Colstrip. If they haven't testified here, I don't know what their position is, and it certainly hasn't been handed to me. Why don't you ask the Portland General Electric people themselves? I believe there's one of them that will be a witness.

Q Mr. Labrie, I'm always impressed with your advice to me on how I should conduct myself, and I shall be properly guided by that, but at the moment, I'm asking you a question, and the question was, whether you knew that the staff of the Oregon Public Utility Commissioner had determined that the Colstrip units were more expensive than all of the other alternatives for the Portland General Electric Company, and therefore, those more expensive alternatives of Colstrip should not be passed on to the rate payers.

A No, I don't know that.

Q You didn't know that?

A No.

Q What may be less expensive for you may be more expensive for the Pacific Power and Light Company, would you concede that as a possibility?

A Yes, and I assume that they're looking at their own problems.

Q What may be more expensive for the Puget Sound Power and Light Company might be less expensive for you. That's possible, too, isn't it?

HEARINGS EXAMINER: That's the same question.

MR. SHENKER: No, no -- different company.

Q And Washington Water Power Company and you don't have the same expenses based upon the same plants, do you?

A No, they have to do their own economic studies to determine what's most logical for their customers.

Q What did you want the Board of Natural Resources and Conservation to do, Mr. Labrie? Did you want them to toss five checks into a hat and pull one of them out to see whose lowest expense they should follow, yours, or one of the other four applicants?

A I don't know how to answer your question. As I've testified, we've determined that Colstrip, for Montana, is the lowest cost alternative, and this is what we would hope that the Board of Natural Resources will view and believe, and the other four companies have the responsibility to do their own testifying on what their economics are, and I certainly have no knowledge of it.

Q For whom is Colstrip the least cost alternative, sir?

A The Colstrip 3 and 4 units are the least cost alternative that we could determine for Montana Power and therefore, for its customers.

Q If, in fact, Colstrip 3 and 4 are not the least cost alternative for any of the other four applicants, do you still want the Board of Natural Resources and Conservation to determine that Colstrip 3 and 4 should be built on the basis of the least cost alternative?

A I don't know --

Q You don't know?

A You're talking about a hypothetical situation. I don't know why any company would be interested in this venture if it wasn't the least cost alternative.

Q You don't know that?

A No, I have no idea why they would be interested in this project if it wasn't their least cost alternative.

Q Well, let me suggest a couple of ideas to you. How about one is, that they made a mistake? Is that possible?

A Well, certainly.

Q How about another one is, I'll scratch your back, and you scratch mine?

A That's ridiculous.

Q You've never scratched anybody's back in your life?

A No, sir. We try to do the most economic thing we can see for our company and for our customers.

Q Sure, that's why the Western Energy Company won't sell coal to the Portland General Electric Company, right?

A I don't think that's true at all.

Q Oh, will the Western Energy Company sell coal to the Portland General Electric Company?

A I have no idea. What I'm saying is, that I assume the Western Energy Company will sell coal as they have coal available and can do the best for Western Energy Company.

Q Now, Mr. Labrie, aside from the least cost alternative, as comparing the four other applicants with the Montana Power Company, I do agree with you, sir, that it is kind of puzzling if it were to be true, that the other applicants were not facing the least cost alternative here, if the Board of Natural Resources and Conservation were to determine that Colstrip 3 and 4 were the least cost alternatives for the Montana Power

Company, when comparing that with Montana Power Company participating in Pebble Springs, or Skagit, or Boardman -- would you think that should be the way they should make up their mind?

A I'm not sure whether I heard a negative or I didn't. Would you repeat the question, please?

Q Sure. Do you think the Board of Natural Resources, if convinced that Colstrip 3 and 4 were the Montana Power Company's least cost alternatives, should make that determination based on a comparison with Montana Power Company participating in Boardman, Pebble Springs, or Skagit?

A Is that the end of the question?

Q Yes.

A Oh. Well, I think the Board of Natural Resources has to consider many things in its deliberations. One of the reasons, and the thing that I'm testifying here about today is that Montana Power made a study and determined that this was the least cost alternative for us, and we're presenting that to the Board of Natural Resources as one of our principal reasons for wanting to develop Colstrip 3 and 4.

Q Well, the real issue before the Board of Natural Resources on the least cost economic question is, how best to get 250 megawatts available to the Montana Power Company some time after 1985, isn't that it?

A No, to meet our needs starting in 1979, which we can't meet, so it's got to be 1980.

Q I'm interested in your reference at page 2, Mr. Labrie, to the testimony of Dr. Alan Morris, in which you state: "He argues that the Colstrip site is more energy intensive and cites several general studies as proof." Those general studies were done by a general contractor, that has the general name of Bechtel Corporation, generally used as your contractor, isn't that right?

A Are you talking about the -- I forgot what Dr. Morris cited. Was it the slurry pipeline study?

Q Yes.

A Yes, that's right. Bechtel did a study on slurry pipelines, and Dr. Morris cited it.

Q Do you conclude from your statement of testimony on page 2, lines 22 through 27, that it's necessary to have coal-fired generating stations at a mine-mouth?

A Let's see now. Lines 22 to 27 don't say that, no.

Q They sure don't, do they, Mr. Labrie. What they do say, in your view is, that it's practically a tradeoff. It's identical in terms of energy loss difference, whether you go by a thousand miles of transmission line across the state of Montana or you use a different way of transmitting the power?

A I believe you're mixing up the economics of the least cost alternative with which mode of transportation uses the least power. In this statement, it says that when you do a loss study, using Colstrip versus the Pacific Northwest versus usin a plant at Spokane, that would be 3.9% of the capacity, whereas you would use 3.85% of the capacity to haul the coal from Colstrip to Spokane.

Q That's the same conclusion that Dr. John Szablya drew in his testimony, isn't it?

A Yes, I believe so. I don't recall exactly.

Q The conclusion, therefore, as Dr. Szablya put it, was that you really can't decide the issue of Colstrip 3 and 4 based upon economics, or indeed, energy intensity of use by itself. What you're really going to decide it on is other policy questions, because you're going to find a tradeoff, isn't that true?

A No, I disagree with you, because you didn't say things the way Dr. Sablya said them.

Q I should hope not. He's had far more degrees than I.

A The point is that the energy intensiveness of the two ways of transmitting the power, by rail versus transmission line, are about equal, but the economics of locating the plant at Colstrip are much better than the economics of locating the plant at Spokane.

Q A subject upon which there has been considerable controversy and dispute, right?

A Well, you people are disputing it, but we believe it quite sincerely.

Q I have no doubt about your personal sincerity, Mr. Labrie, nor do you of ours, I presume, but I think that the issue we should discuss, sir, is whether or not it is not the case that if you find, in effect, a tradeoff for energy intensity or energy loss, why are you going to subject Montana to 500-kV transmission lines across the face of the entire state, an additional burden of pollution in southeastern Montana, in an otherwise pristine area, rather than simply building the plants in the Spokane area, where they already have begun to prepare for the impact of that kind of building?

A I'm not with you on the last of your question. Why are we building a plant at Colstrip, is that what you're saying?

Q If you don't understand the question any better than that, I think it's hopeless for us to communicate further on that. Let's pick up the last part there, where you didn't follow me, that is, the preparedness of Spokane for a new coal-fired generating station. Did you not know, Mr. Labrie, that the President of the Washington Water Power Company, Mr. Wendell Satrie, addressed the New York Society of Security Analysts on March 10, 1976, and advised them that the Washington Water Power Company was preparing to build a coal-fired generating station in their service area in eastern Washington? Did you know that, sir?

A No.

Q Well, that was reported in the press here in Montana. Do you not read the press, such things as the Great Falls Tribune, on the 12th of March?

A Well, perhaps we're hung up in semantics. My answer -- do you want the rest of it? I know that Washington Water Power in the future will entertain notions that they should put a plant on their system, which only makes good sense, in my view, because I don't think any part of the country should be too deficient in power. It's too difficult from an operating point of view, but I know of no plans that Washington Water Power has in the immediate future, that are real plans for a real plant at a real location.

Q I see. Did you know that they ordered a boiler?

A No, I didn't. I'm wondering if you're confusing this with Idaho Power, who did order a boiler.

Q Idaho Power, of course, has, at their Pioneer Station.

A Yes, the Pioneer Station did order a boiler. I'm not aware that Washington Water Power ordered a boiler.

Q Do you know of the proposed slurry pipeline to be built from Gillette, Wyoming, to Spokane, Washington, to take coal from northern Wyoming to the Washington Water Power Company's new proposed coal-fired generating station?

A No, and I don't believe it's practical or possible to get one in at this time.

Q Oh, really? Did you know that Pacific Power and Light Company was one of the co-venturers in the building of that slurry pipeline?

A No. I know of a pipeline in southern Oregon that has been discussed, but I didn't realize that there was any going to Spokane. I don't know of that.

Q Do you know where Roosevelt, Washington is?

A Yes.

Q Is that north of southern Oregon?

A Yes.

Q Did you know that the Pacific Power and Light Company is proposing to build 10,000 megawatts of generating facilities there which will be either nuclear or coal-fired or a combination of both, serviced by coal from the Pacific Power and Light Company's Decker station by slurry pipeline or by rail, did you know that?

A I know that because I just talked recently to Pacific Power and Light about this matter, that they are trying to validate or get approval of a site at West Roosevelt, which is right near Boardman that we've discussed previously so that they have an option available to them to go somewhere with the plant.

Q And your expertise, Mr. Labrie, as I recall testimony previously, is not really in the area of load forecasting? You left that to Mr. Hofacker in the past, isn't that true?

A That is correct.

Q Nevertheless, you know how to read a load forecast and you know that Pacific Power and Light Company has not included the West Roosevelt site in their load forecast, don't you?

A Well, as far as I know, West Roosevelt's site is quite recent, so they probably haven't, but I don't know that.

Q Back on this slurry pipeline business, you tell us in your statement, with the rather recent expertise you acquired on that subject, that was on October 27, 1970, isn't that right?

A That's the first meeting that I recall attending on this subject.

Q You met with a Bechtel slurry pipeline expert at that time?

A That's correct.

Q After you read Dr. Morris's statement, did you go back to the Bechtel slurry pipeline expert and say, "Hey, fellow, what do you mean saying the slurry pipeline is better than trains and trains are better than transmitting by wire?" Did you have any further discussions on that subject?

A Yes.

Q Did he tell you he recanted all his past sins and he now thought that transmission by wire was better than by train and train better than slurry pipeline?

A Oh, no. A slurry pipeline, if you can overcome the difficulties of it, is a means of transportation that we certainly have to look at as an alternative to consider in moving power one way or another.

Q You know, do you not, Mr. Labrie, from the Bechtel studies, transmission by wire comes out last on all the studies of the alternatives?

A It may in these people's, but I don't know that. Perhaps it's true in their studies. As I've testified, it takes a specific study in our case, to show a specific situation, and we've done that.

Q By the way, did you know that the proposed slurry pipeline route that I was just discussing with you, to go into southern and eastern Washington, will run across the state of Montana?

A I didn't think that the one that I was looking at would, no.

Q While we're on the subject of your recent knowledge, did you know that the Pacific Power and Light Company also was considering the opening of a coal mine in western Washington for the shipment of coal west? Excuse me, Mr. Labrie, Mr. Sheridan says I misspoke myself. I meant to say western Montana.

HEARINGS EXAMINER: Now, let's clarify the question. I'm confused. Why don't you start over? They're going to ship the coal to western Montana, you say?

Q From western Montana, from a new mine, to be opened in the western part of Montana, westward ho!

HEARINGS EXAMINER: They're going to ship coal from western Montana west?

MR. SHENKER: Yep.

A I didn't know about that.

Q You didn't know about that?

A No.

Q Gee, that sounds like sort of a ducky idea, though, doesn't it, if you have a coal mine in western Montana that's near the load centers of Montana, and you can build mine-mouth stations which turn out to be coal-fired load center stations, too, right?

A Would you repeat that, please?

Q Well, if you had coal in western Montana, that's where the loads are in Montana, right?

A I can't recall coal in western Montana, to start out with.

Q Son of a gun! Well, if there were some there, that would be where the loads are, right?

A As far as Montana Power is concerned, yes.

Q Sure, and then you could build coal-fired generating stations that would turn out to be both mine-mouth and load centers, as far as Montana is concerned, right?

A That would be most fortunate if we could, although we're not doing too badly when we locate at Colstrip, only 90 miles from --

Q No, but I guess the other four applicants have a longer way to go when they locate at Colstrip.

A That's right.

Q Now, Mr. Labrie, on this communications problem I adverted to a moment ago, I want to refer to it again. On page 4 of your statement, beginning at line 15, the opponents to your application keep telling you that you haven't provided any apples, and your response, regularly, is, we have, too, provided oranges. I think we ought to talk about just apples for now, if we can. The opponents have not said to you, sir, that you did not study economic expense alternatives for how to go other than through Colstrip 1 and 2 and its disciples and descendants?

A I believe that --

Q Just a minute, Mr. Labrie -- what the opponents have been saying to you, and what I now put to you as a question is, whether there exists a written study of any kind in any form in which you have assessed the non-economic -- that is to say, environmental, for example -- alternatives other than Colstrip 1 and 2? Have you?

A This is what we hired Westinghouse for, yes.

Q Well, other than Westinghouse, Mr. Labrie, you don't have any, do you?

A Westinghouse was $800,000 and some of a study. I would say that was pretty substantial and that was to provide background information to the Department of Natural Resources for this purpose.

Q Westinghouse came only two years after you decided to build the plants. Now, let's ask if you had any studies done as alternatives to Colstrip 1 and 2 of a non-economic nature before you went to Colstrip 1 and 2.

A No. I think I have testified in detail on what considerations went into that.

Q The Lt. Governor of the state of Montana was on the witness stand and he was asked, didn't he know that you folks had done a lot of other studies, considering other alternatives, and said, "I didn't know that; I wish you'd show them to me," and the representative of the Northern Cheyenne Tribe said, "Have you done any other studies, looking at alternatives to Colstrip 1 and 2?" You said, "I'm not so sure, I'll check, and if I have some, I'll let you know." We have the product of your researches. That's Exhibit No. 267 and 267-A and 267-B, and they're all economic expense studies, and you've got 50 more just like those in your files, don't you?

A That's correct.

Q I think we've finally talked about apples together Mr. Labrie, and on that triumphant feeling on my part, at least, I shall close.

MR. SHENKER: Thank you, sir.

HEARINGS EXAMINER: Mr. Meloy?

MR. MELOY: I have no questions of Mr. Labrie, Mr. Davis.

HEARINGS EXAMINER: Mr. Peterson?

MR. PETERSON: May we take a few minutes?

Rebuttal, Redirect, by Applicants

By Mr. Peterson:

Q Mr. Labrie, in the study of sites for the construction of generation stations, what generally takes place with regard to looking at alternatives?

MR. SHENKER: May we have a definition of the time frame and what did take place before 1973 or 1975?

Q In the study of sites for generation of electrical energy, based on your experience, what, generally, would you look at for alternatives?

A We'd look at any alternatives that would appear to us in the technology existing at the time to be feasible, and in the case of looking at Colstrip 1 and 2, for the time frame and size we were talking about and so on, we did not look at slurry pipelines and we looked at central Montana and transmission lines and rail. If I were to look at a site, for instance, in Oregon and had to try and find one, I would certainly look at the feasibility of coal slurry pipelines, although I see many problems with it, and I doubt very much that it would turn out to be the optimum way to transmit the energy.

Q Has there been an indication given to you that Washington Water Power Company is going to build a plant in eastern Washington?

A I believe Washington Water Power Company -- I've just found out -- has -- well, I knew this in general -- that in the middle to late 80's, they want to be in a position to be able to build a plant somewhere on their system, so they're starting out now to try to find where they can site a plant in the future and then look at the economics of that and all the similar studies that we had to go through before getting Colstrip 1 and 2.

Q There certainly isn't any indication from Washington Water Power that this site is going to replace their interest in Colstrip 3 and 4, is there?

A Absolutely not.

Q Have they ordered a boiler for this?
A No, of course not.

MR. PETERSON: That's all I have.

Rebuttal, Re-cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q Mr. Labrie, two questions, first on the subject of alternatives that might be considered. You used to be the world's leading expert for the Montana Power on geothermal power. Wouldn't you look at geothermal as an alternative to consider if you were planning now for some time in the mid-80's?
A I would certainly look at whether the geothermal situation -- to see if there was anything developing that you should consider. When considering a new plant site, why you'd look at anything you could think of that might develop, and most of them would be easily rejectable and the few that were left, you'd study in depth.
Q You'd want to look at such things, wouldn't you, as the ability of industries to service themselves with geothermal sites?
A Pardon me, I didn't hear you.
Q Wouldn't you want to look at the ability of industries to service themselves with geothermal sites?
A I see nothing wrong with looking at the ability of industries to service themselves.
Q Are they doing so now?
A Perhaps in some situation where some industry is.
Q That is happening in Oregon. That's been reported.
A I believe I've seen some reference to it.

Q On the Washington Water Power Company building a new facility, you seemed a little bit more definite about that prospect in your redirect examination than you were in the cross-examination questions I asked of you, sir. I wonder if you might help me in a scenario that I could put to you. Let's just assume facts which are, of course, contrary to your working assumptions, that between now and 1985, in fact, the Montana Power Company will not need additional generating facilities which it does not now have, and let's assume further that in 1985 or 1986, the Washington Water Power Company builds a coal-fired generating station some place near Spokane. Would you consider as an alternative for the Montana Power Company in that time frame after 1985 to join with the Washington Water Power Company in their new coal-fired generating station in the Spokane area?

A I'm sure that in the time frame of 1985 or beyond, when we're looking for additional resources to meet our load, we will consider all alternatives that are available to us and know about and certainly, if Washington Water Power has some available capacity, we'd consider it, yes.

Q Wouldn't you expect the Washington Water Power Company would have the same kind of thought pattern you've had with respect to the economy of scale and the size of the coal-fired generating station so that they would build one larger for their own needs?

A Yes. I think all the utilities are only being intelligent in going in partnership on plants other than each one building its own and having to sustain the higher reserves and the loss of economy of scale.

Q It would just make eminent good sense, wouldn't it, for you to participate with Washington Water Power and take up the extra capacity they would not need in building a plant of such a scale?

A It might make good sense. I don't know about the particular situation at that particular time, but it's certainly an alternative that we'd consider.

Q Have you had any blushes of planning on that consideration yet?

A Have we had any what?

Q Well, we've had problems before in terms of what's a plan, you know, whether a plan is something that you have written in stone or a plan is something that you've thought about. I wanted to get to the first stage of the planning. I called it a blush of a plan. Do you have that first stage of planning yet to join with the Washington Water Power Company in their new proposed facility?

A No. They haven't gone far enough to know the time frame or where they might build a plant or anything, so it's too early to discuss that sort of thing.

MR. SHENKER: Thanks.

MR. PETERSON: After those couple of questions, I have no further questions.

HEARINGS EXAMINER: Very well, the witness is excused.

(WITNESS EXCUSED.)

HEARINGS EXAMINER: We'll recess until 9:00 o'clock tomorrow morning.

(HEARING RECESSED AT 4:40 P.M.)